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THE DEVELOPMENT OF BUILDING ESTATES

THE DEVELOPMENT OF BUILDING ESTATES

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A PRACTICAL HANDBOOK FOR THE USE
OF SURVEYORS, AGENTS, LANDOWNERS,
AND OTHERS INTERESTED IN THE
DEVELOPMENT, MANAGEMENT, EQUIPMENT
ADMINISTRATION, OR REALIZATION OF
BUILDING ESTATES.

BY

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WITH PLANS AND ILLUSTRATIONS

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523

'Salus populi suprema est lex'

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PREFACE

During recent years much attention has been directed to properties that offer facilities for building development, first, by the legislative proposals that have been put forward to levy a special rate or tax on that class of property, and, secondly, by the attempts that have been made to introduce a more comprehensive method of town planning, and thereby to improve the sections devoted to the accommodation of the working classes.

A great deal of misconception is prevalent regarding the actual returns which so-called building land yields to the owner, and in contrasting its value when used for agricultural or accommodation purposes with the price which it may have realised during development, the heavy expenditure that has been made upon the land by the owner in equipping it for building operations is often either overlooked or minimised. Moreover, the subject of building development is still further complicated by the arbitrary nature and chaotic condition of the bye-laws and regulations at present in force.

So far as I am aware, there is no up-to-date handbook dealing comprehensively with these and other matters connected with the development of building estates, and my object, therefore, in publishing this manual is to explain in a simple and concise form the different steps that have to be taken in dealing with such land during its transition from the hands of the agriculturist to those of the builder. For that purpose I have divided the subject into some eight chapters, commencing with an attempt to define the meaning of the term 'building land,' and following with suggestions as to the management of such land during its transitory stages, and the improvements that may be effected in order to accelerate the process of ripening. Special attention is directed to the modes of procedure to be followed, either under the Metropolitan or Local Authorities, in the formulation of development schemes, and the construction of roads and sewers; the financing of builders; the valuation of building properties for various purposes; and the ultimate methods of realisation.

A digest has been prepared of those sections of the Housing and Town Planning Act, 1909, that are applicable to estate development, and an attempt has also been made to explain the practical bearing of the novel and complicated provisions relating to the taxation of land values comprised in Mr. Lloyd George's Finance Act, 1909–10.

Numerous examples are given—the majority of which I have drawn from my own experience in superintending the development of some of the principal estates in the kingdom—to illustrate the practical application of rules and suggestions, and which, it is hoped, will prove of service to the younger members of the surveying profession for purposes of reference, as well as to the owners of building land who may be interested in the subject of its development or realisation.

I have to thank my son for preparing the plans and illustrations, which will materially assist in the elucidation of the subject-matter.

In endeavouring to accomplish the object of the treatise, I have referred to various other publications, among which I wish to specially acknowledge my indebtedness to Boulnois' 'Municipal and Sanitary Engineers' Handbook,' Lloyd's 'Municipal Year Book,' and Horsfall's 'Example of Germany in the Improvement of the Dwellings and Surroundings of the People.'

TOM BRIGHT.

10, Mount Street,
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THE DEVELOPMENT OF BUILDING ESTATES

CHAPTER I

BUILDING LAND: ITS CHARACTERISTICS, QUALIFICATIONS, AND MODE OF PREPARATION

Definition of ' Building Land.'—The question as to what is ' building land,' has grown in importance of recent years, largely on account of the legislative proposals which have been made to impose a special tax on that class of property. Many attempts were made by experienced surveyors and others to define the meaning of the term before the Royal Commission on Local Taxation, but with only partial success. Indeed, it was stated that ' there is no definition of what building land is, and no satisfactory definition can be given.' A well-known member of the Surveyor's Institution, however, is reported to have described it as ' land within an urban area capable of being opened up into adequate roads, and of being drained into public sewers, and in a situation where it would attract occupiers.' This definition would seem to include practically the whole of the land capable of development under what may be termed ‘hygienic conditions,’ but there are cases where considerable areas of land, especially on the chalk formation, are developed for the sites of good-class houses the drainage of which is not connected with any public sewers, but which, nevertheless, attract occupiers. With all deference for such definitive proposals the writer is inclined to favour that given recently by an examination candidate who described ‘ building land ’ as ‘ land capable of bearing a crop of occupied houses or similar buildings.’ This concise though facile definition was probably evolved from the old axiom that the most profitable crop obtainable from land is that of houses. The reply, however, embodies more truth than appears at first sight, for the capability of producing a crop of any kind implies that the land has been specially cultivated or prepared for the production of that crop.

It will be observed that in both of the foregoing definitions it is assumed that the so-called ‘ building land ’ must be ripe for immediate development, and that during the ripening stages it would not be building land at all.

Although an expert may not find much difficulty in deciding whether or not a block of land is actually ripe for building, it is scarcely possible to differentiate by means of any hard-and-fast line or rule between land which is ripe, and that which is only ripening. The question must for all practical purposes necessarily form a matter for the exercise of mature judgment, great care being always taken not to force land into the market before it is fully ripe, or the permanent interests of the owner may be seriously prejudiced.

In the Finance Bill, 1909, an important distinction is drawn between 'agricultural land' and that which is fitted for use as 'building land,' or for the purpose of any business, trade, or industry. For the assessment of duty the difference is made dependent on value, and land that is used for the purposes of agriculture (including market gardens), and the site value of which exceeds £50 per acre, continues to be regarded as agricultural land until it has acquired a higher value for use in some other industry, or for building purposes, and when it becomes chargeable with undeveloped land duty. It will be seen, therefore, that the somewhat vague though comprehensive term 'undeveloped land,' includes land which may at any time possess an element of building value in excess of its agricultural capabilities.

Although less comprehensive than 'undeveloped land,' the terms 'building estates' and 'building properties,' as used in this treatise, will be understood to comprise blocks of land that may be immediately ripe for building operations, as well as other areas possessing in some appreciable degree a prospective element of building value, and thus undergoing the transitory process known as ripening.

Period of Transition.—The preparation of land for building operations is sometimes facetiously spoken of as 'nursing.' The occupation, however, is one that affords ample scope for the exercise of foresight and sound judgment. To be successful from a financial point of view, a speculator must not only be able to form a closely approximate estimate of the length of time that a property will require to mature under skilled management, but also to predetermine the best method of realisation and to seize the first favourable opportunity that occurs of effecting a sale. Indeed, in the words of a well-known statesman, building development forms ‘ one of the most difficult, one of the most risky, and one of the most important trades we have.’ The method of dealing with building land to which we have referred is, of course, different from that known as ‘ holding up,’ where, it may be, on account of some selfish motive, an owner absolutely refuses either to sell or to develop a central block of land, and thus hinders the healthy expansion of the adjoining town.

To the ordinary observer, however, building land may seem to acquire its potentialities *per se*, and entirely apart from any external assistance or management on the part of the owner. This view may be virtually correct in regard to comparatively small areas which are more or less dovetailed in (most aggravatingly or advantageously, as the case may be, at times) with the adjoining estates. Or, where the sudden discovery of mineral wealth, or the establishment of important factories in a locality, has given rise to an unexpected demand for building sites, in which case the enhanced value may possibly be brought about by circumstances beyond the influence or control of the owner, and may, therefore, be described as ‘ unearned increment.’ In the case of larger properties, however, their early maturity under normal conditions, as well as their ultimate success from a financial point of view, depend in no small measure on the skill and foresight bestowed on their management during the period of transition from agricultural to building value.

It will be seen, therefore, that the internal qualifications of building land are usually of a twofold character, being partly inherent and partly acquired, and include:

(1) Natural adaptability in regard to its surface configuration, combined with certain advantages of position in relation to local centres of population; and

(2) Such artificial improvements as have been effected under predirected efforts of management in order to facilitate the utilisation of the land for purposes that are incidental to public and general progress.

It is possible for land to be situated adjacent to the main street of a town, and yet not be eligible for building purposes on account of its precipitous nature, as in the case of certain properties at Torquay; while on the other hand, the surface may be such as to offer every facility for development, but the land may not be within reach of a town. Again, a block of land may possess all the physical qualities necessary for advantageous utilisation as building sites, but still be rendered ineligible until certain improvements, such as the construction of a railway or tram line, or the building of a viaduct or bridge, have been effected. It must not be forgotten, therefore, that while possessing such internal qualifications as have already been mentioned, the utilisation of building land may, nevertheless, be dependent on certain extraneous improvements that have to be carried out at the expense of other, and it may be, disinterested parties.

Although theoretically distinct it is difficult in practice to apportion the money-value of building land as between these varying qualifications. Such an apportionment is, however, rendered necessary by the Finance Bill, 1909, which contemplates the determination of (1) the value of the natural site; (2) the value of the improvements effected by the owner; and (3) the value of the 'unearned increment' which has accrued from the expenditure made by other landowners, or by the local ratepayers.

For practical purposes, however, the bearing of the several qualities which render land eligible for building operations has to be considered in a combined rather than a separate form, both in regard to the artificial preparation, as well as the subsequent development, of estates.

Management during Transition.—In this country the management of land that is gradually maturing for building purposes is generally directed by its owner, or his representative, as well as the ultimate method of laying it out; but on the Continent, more especially in Germany, the scheme of development is formulated by the local authorities, and the erection of the buildings is carried out under the strict supervision of the 'building police.' In the latter case, it is not surprising to find that the owner's interests do not form the first consideration, and, under the circumstances, there is little inducement for him to make any expenditure in preparing his property for building purposes. It is often urged that in the development of localities the interests of the landowners and those of the community are identical, and there is undoubtedly some truth in the assertion, but British landowners, who consider themselves capable of looking after their own interests, prefer, nevertheless, to have a controlling voice in the disposal of their own properties.

The method of management during the transition period to which we have referred may be directed to the following, among other matters, viz. :—

I.—Obtaining the best annual returns possible from the land ;

II.—Executing such improvements as will assist in rendering the land eligible for building at the earliest possible date, and that, by adding to its residential qualifications, will also increase its value for that purpose.

I.—Annual Returns during Transition.

Very little difficulty is experienced in letting land situate on the outskirts of towns, and at rents in excess of its ordinary agricultural value. The arable land is generally utilised for market gardens or nurseries, while that under grass may be let for sporting purposes such as golf links, polo, hockey, or football grounds, cricket pitches, or as accommodation land to meet the special requirements of butchers and other tradesmen. The annual returns obtainable under such lettings will, however, depend in a large measure upon the security of the tenure that can be offered. Where the development is comparatively remote, and the land can be let under lease for a lengthy period, tenants may be willing to invest the necessary capital for adapting it for use in one of the games above mentioned, but where the land may be required at any time for building, and can only, therefore, be let under a yearly or quarterly tenancy, such outlay is not justified. One great drawback to the granting of a long lease, from an owner's point of view, is that he is unable to take advantage of any unexpected demand for building land that may arise during the term, and which may have been fully met at the expiration of the lease. In order to partially reconcile these conflicting interests, it is customary to reserve the right for the owner to resume possession of any portion of the holding (except the homestead) for building purposes, upon making an equitable allowance in the rent, and paying compensation for tenant-right. It tends to prevent friction and to facilitate a settlement with the lessee, if the rate of allowance in the rent, and the basis of compensation be determined in the lease or agreement. For this purpose the rate of allowance is often fixed at about double the average rent, per acre, payable for the holding ; while the compensation may be limited to a sum not exceeding double the amount, per acre, allowed in respect of the rent, i.e. if the average rent of the holding be £3, the rental allowance in respect of the land taken would be at the rate of £6 per acre, per annum, for the remainder of the term, and the amount of compensation would not exceed £12 per acre, for any portion of such land.

Unless the right to resume possession of portions of a holding, for the purpose of building development, is clearly shown by the lease to have formed part of the terms agreed in respect of the letting, it will be open for a tenant to claim compensation for unreasonable disturbance under the provisions of the Agricultural Holdings Act, 1908, if any land is taken from him.

The same remarks would also be applicable to land used for market gardening purposes, and in this case it is highly desirable that the maximum limit of compensation should be fixed, as previously suggested, or the land-owner may be subjected to a heavy claim in respect of disturbance and improvements.

Provision is made in section 23 of the Agricultural Holdings Act, 1908, that in the case of a tenancy from year to year, the landlord may give to the tenant a notice to quit with the view to the use of land for the erection of houses, the making of roads, and other specified purposes, and no objection can be taken to such notice.

The clause given on p. 319 *post* is suggested for insertion in leases and yearly agreements, applicable to such lettings as those to which reference has been made.

II.—Preparatory Improvements.

In effecting improvements on a prospective building estate efforts will be directed to the removal of obstacles or impediments that would retard development, as well as to the carrying out of certain alterations and additions that would tend to expedite that object. Among other matters that may well be cleared away may be mentioned old ditches conveying liquid manure or sewage, ponds of stagnant water, pigs-food boiling and other similar establishments, the noxious smells from which are likely to prejudice people and give the property a bad name. Nor, for the same reason, should the adjacent land be let for a tipping-place for manure or other refuse, or for the manufacture of manure or tanyards ; while that let for the formation of a sewage farm, or sewage outfall works, should not be within one mile of the building sections.

Tree-planting.—Of the improvements that may be carried out one of the most important is, undoubtedly, that of tree-planting. Where under a well-considered preliminary scheme the lines of the principal roads have been determined, a belt of plantation may with advantage be formed on each side of such proposed roads, in the case of blocks intended for good-class residences, thus affording a screen from the dust and noise of motor traffic. Portions of the property, suitable for smaller semi-detached villas, may well be planted with a row of trees on each side of the roads. If the site of the land that will be devoted to pleasure grounds or gardens in connection with the development can be predetermined, the more important trees might be planted, at least to such an extent as to indicate in outline the advantages attached to the idea; while shrubbed plantations might be formed at the junctions of the principal roads.

Trees selected for planting by the sides of roads should be hardy, not much affected by drought, of fairly rapid growth, and of graceful form whether in full leaf or when bare in winter. The stems should be from eight to ten feet in height and two to three inches in diameter, and be planted in the autumn. The distance apart of the trees is largely a matter of taste, but from thirty to fifty feet is generally considered close enough. The trees most suitable for the purpose are given, somewhat in their order of merit for clay or clay loam soils, in the following list:

List of trees suitable for planting at the sides of roads :—

Western Plane (*Platanus acerifolia*).
Lime (*Tilia vulgaris*).
Horse Chestnut (*Æsculus hippocastanum*).
Acacia (*Robinia pseud-acacia*).
Tree of heaven (*Ailanthus glandulosa*).
Black Poplar (*Populus nigra*).
Balsam Poplar (*Populus balsamifera*).

Tulip tree (*Liriodendron tulipifera*).
Birch (*Betula Alba*).
Beech (*Fagus sylvatica*).
Elm (*Ulmus campestris*).
Sycamore (*Acer pseudo-platanus*).
Ash (*Fraxinus excelsior*).
Lombardy Poplar (*Populus nigra pyramidalis*).
Maple (*Acer campestre*).

Of the trees mentioned in this list, the western plane may be considered the most desirable for situations where the building line will not be less than twenty feet, and the lime as being the next in order.

Plantation Belts.—If a portion of the estate is to be utilised for the sites of factories or works, it may be desirable to shut off such section as much as possible from the residential blocks. This may sometimes be effectually done by taking advantage of the surface configuration, and forming, along judiciously selected lines, belts of plantation of sufficient depth to meet the special requirements of the case.

In addition to the carrying out of such alterations or improvements as have been suggested, other matters will call for the special attention of the person who is supervising the preparation of a building estate. These will include, *inter alia*, questions relating to boundaries, footpaths and other rights of way, encroachments, water rights, and other easements, outgoings, &c.

BOUNDARIES.

Hedges or Fences.—When land has become ripe for building, and has to be dealt with in small parcels, the dimensions of which have to be given in feet and inches, any doubts connected with the original boundaries of the property will probably prove a source of much vexation and trouble. Unless the ownership of the boundary hedges or fences can be proved from old estate plans, or from other unquestionable evidence, disputes are sure to crop up. The rule that the ownership of an enclosure also includes the hedges and ditches where the latter are on the outside, may be varied by acts of ownership, or the ditch may have become almost obliterated in course of time by the tread of cattle, the cleaning out and throwing back of the soil, and the effect of the weather. Where this is the case the original width of the ditch cannot be determined with any degree of precision, and it is usual, therefore, to allow from three to four feet from the root of the hedge according to the local custom.

In the case of railway boundaries, the quickset hedges and outside protecting fences invariably belong to the Company, and in cases where the quickset hedges have become sufficiently established so that the protecting fences have been removed, an allowance of three or four feet from the outside root of the quickset hedges should be made for the land belonging to the Company.

Roads and Streams.—When an occupation road, or a stream forms the dividing line between two properties, the boundary is presumed to extend to the centre of the road or stream in each case.

Boundary Walls.—The ownership of boundary walls is generally established by the production of plans, or other reliable evidence of their having been built and kept in repair by the party claiming them, and this usually includes the land on which the walls stand. The common user of a wall dividing lands of different owners is *prima facie* evidence that the wall and the land on which it stands belong to both owners, as tenants in common (*Cubitt* v. *Porter*, 8 B. & C. 257). But where the precise extent of land originally belonging to each owner can be ascertained, the presumption of a tenancy in common does not arise, and each party is the owner of so much of the wall as stands upon his own land. In the absence of evidence as to the ownership of a party-wall, it is presumed to belong to the adjoining proprietors as tenants in common. The position of the buttresses if on one side only of the wall is sometimes taken as evidence as to ownership.

The ownership of a post-and-pale fencing is determined by the pales being placed on the outside of, and the nails driven towards, the owner's property. The owner erecting the posts places them inside on his own land.

Rights of Way.

Footpaths, &c.—Land situated on the outskirts of towns is often subjected to much trespass, and care has to be taken that rights of way are not established. Footpaths, especially, often interfere with the utilisation of land for building purposes, and in many cases the development cannot be carried out until such footpaths have been diverted. The occasional user of a farm road by strangers, chiefly for purposes of pleasure, affords evidence of a public rather than a private way, and may be taken as evidence of a dedication to the public as a highway, unless it can be shown that this was not the intention of the owner. The question of dedication is one of fact, and the evidence of user by the public may be upset by acts of interruption from time to time by the owner. If a person opens his land so as to let the public walk over it continually, they would, after a few years, be entitled to pass over it and use it as a way; if he does not mean them to use it as a way, he should do something to show that he gives a licence only. The common course is to shut it up for one day in the year (*British Museum* v. *Finnis*, 5 C. & P. 460).

Diverting of Right of Way.—If a right of way is once established, the procedure for stopping or diverting it is somewhat tedious. In section 84 of the Highway Act, 1835 (5 & 6 *Will.* IV. c. 50), it is provided 'that when the inhabitants in vestry assembled shall deem it expedient that any highway should be stopped up, diverted, or turned, either entirely, or reserving a bridle-way or footway along the whole or any part or parts thereof, the chairman of such meeting shall by an order in writing direct the surveyor to apply to two justices to view the same, and shall authorise him to pay all the expenses attending such view, and the stopping up, diverting, or turning such highway, either entirely or subject to such reservation as aforesaid, out of the money received by him for the purposes of this act, provided nevertheless that if any other party shall be desirous of stopping up, diverting, or turning any highway as aforesaid, he shall by notice in writing require the surveyor to give notice to the churchwardens to assemble the inhabitants in vestry, and to submit to them the wish of such person; and if such inhabitants shall agree to such proposal the said surveyor shall apply to the justices as last aforesaid for the purposes aforesaid, and in such case the expenses aforesaid shall be paid to such surveyor by the said party, or be recoverable in the same manner as any forfeiture is recoverable under this act; and the said surveyor is hereby required to make such application as aforesaid.'

When upon the inspection of two such justices it shall appear 'that any public highway may be diverted and turned, either entirely or subject as aforesaid so as to make the same nearer or more commodious to the public,' and the owner of the land through which it is proposed to make the new highway consents in writing, 'or if it shall appear on the view that any public highway is unnecessary,' the justices are to direct a notice to be affixed at each end of the highway and to insert a notice in a newspaper published in the county, and to give a certificate (sec. 85), which is to be read at the quarter sessions next after the expiration of four weeks from the date of the certificate. The justices at quarter sessions will then, in default of an appeal, or in the event of an appeal being dismissed, make an order to divert and turn, and to stop up such highway, either entirely or subject as aforesaid (sec. 91).

Under the Local Government Act, 1894, the powers, duties, and liabilities of the Rural Sanitary Authorities and Highway Authorities, were transferred to the Rural District Councils, and in future a public right of way may not be stopped or diverted without the consent of the Parish Council and of the District Council, and such consent is not to operate except with the consent of a parish meeting of which two months previous notice is to be given.

ENCROACHMENTS.

Waste Plots.—In disposing of building estates in detail it often happens that certain intervening plots of back land are, on account of their irregular shape or position, left unsold. It is well to see that these plots are not used without permission, or a claim to ownership may be established. Under the Real Property Limitation Act, 1874, a person who holds possession of land (otherwise than by actual fraud) for twelve years without acknowledging any other person's right to the land, obtains a possessory title thereto. In neglecting to assert his rights, therefore, during the period named, an owner may lose his title to such land.

Moreover it is essential that an owner should see that none of the parties acquiring portions of the estate, encroach beyond their proper boundaries, or carry out windows or open doorways in such a manner as to acquire prescriptive rights that would prejudice the development of the adjoining land.

Servient Easements.—Among other servient easements may be mentioned those relating to the supply of water, light, drainage, and air, in favour of adjoining properties. Care should also be taken that adjoining owners are not allowed to acquire a right to do that which would otherwise be actionable as a nuisance, such as fouling a stream, or polluting the air.

Dominant Easements.—On the other hand, there may be certain advantageous rights connected with a property that may have an important bearing on its development, and which should, therefore, be carefully preserved. Such dominant easements may include rights of drainage, and water supplies from adjoining properties, rights of way, of a limited nature such as footways, bridle-roads, carriage-ways, a way to church, or a road for occupation purposes only, or they may be for more general and universal purposes.

Development and Road Improvement Funds Act, 1909.

This measure, which was intended to be complementary to Mr. Lloyd George's Budget, has a twofold object: (1) the economical development of the United Kingdom, and (2) the improvement of the roads. The development section is directed to assisting agriculture and rural industries, forestry, the reclamation and drainage of land, the construction of light railways, harbours, and canals, and the improvement of fisheries. The second part is devoted to improving the facilities for road traffic, and has, therefore, a more or less direct bearing on the subject of this treatise.

For the purpose of road improvement the Act provides for the formation of a Road Board, with power to act, either directly, or indirectly through the existing highway authorities, to whom the Board can, with the approval of the Treasury, make advances in consideration of the authorities undertaking to construct such new roads, or to effect such improvements in existing roads as will facilitate road traffic. The construction of new roads, however, is to form a subsidiary matter, and the money available will be used, in the first instance, on the improvement of existing roads, either by widening, cutting off corners, levelling, and treating the surface to mitigate the dust nuisance, and the doing of any other work in respect of roads, beyond ordinary repairs, essential to placing the roads in a proper state of repair.

Expenses.—The funds required for carrying out the foregoing improvements were intended to be provided by the nett proceeds of the duties on motor spirits and licences comprised in Mr. Lloyd George's Budget proposals. The Act, however, provides that the expenses of the Road Board are to be defrayed out of a road improvement grant, and the sums to be expended in any year are not to exceed one-third of the estimated receipts for that year. With the approval of the Treasury, the Road Board may borrow on the security of the grant for the purpose of meeting any expenditure which appears to the Treasury to be of such a nature that it ought to be spread over a term of years, but the total amount required for the payment of interest on, and the repayment of the money, must not exceed £200,000 in any one year.

Acquisition of Land.—Both the Road Board and highway authorities are given compulsory powers for the acquisition of land, the procedure being identical with that hereafter described in connection with the Housing and Town Planning Act (see p. 79, *post*). In addition to the power of acquiring land for new roads, the Board may acquire land on either side of the centre of the proposed roads to the extent of 220 yards in depth. This right is intended to enable the Road Board, to a great extent, to reap the increment in value of lands adjoining the new roads due to their construction, and it is expected that this source of revenue, as well as the charges for allowing private roads in the neighbourhood to communicate with the new roads, will, in some measure recoup the Road Board for the expenditure on construction and maintenance.

OUTGOINGS

Nature of Charges.—These usually consist of tithe rent-charge, and land tax, together with quit rents, copyhold rents, and other payments in respect of copyhold properties, in addition to the ordinary parochial rates. While land is being used for agricultural purposes it may not be deemed necessary to redeem either the tithe, or the land tax, or to enfranchise the copyhold sections. Before commencing building operations, however, the question of relieving the land of these charges should be carefully considered.

Tithe.—This burthen, which was originally payable in kind, was commuted into a half-yearly rent-charge under the Tithe Commutation Act, 1836. The awards of the Tithe Commissioners were based on the average prices of grain for the seven years preceding 1836, wheat being taken at 7*s.* 0¼*d.*, barley at 3*s.* 11½*d.*, and oats at 2*s.* 9*d.* per bushel, respectively, £100 tithe commutation rent-charge being made up as follows:—

	£	*s.*	*d.*
94·955488 bus. wheat at 7*s.* 0¼*d.* ..	33	6	8
168·421052 bus. barley at 3*s.* 1½*d.* ..	33	6	8
242·42424 bus. oats at 2*s.* 9*d.*... ..	33	6	8
	£100	0	0

Therefore, for every £100 of tithe rent-charge in any subsequent year, the above quantities of wheat, barley, and oats were to be purchasable at the average prices for the seven preceding years ending on Thursday before Christmas each year. The value for the year 1910 is made up as follows :—

	£	s.	d.
94·955488 bus. wheat at 3*s.* 9½*d.*	18	0	0¼
168·421052 bus. barley at 3*s.* 0½*d.*	25	12	3½
242·42424 bus. oats at 2*s.* 2½*d.*	26	15	4¼
Value per £100 for 1910	£70	7	8

In the earlier awards the tithe rent-charge was apportioned in one sum upon the whole of the land comprised in each ownership or holding ; but finding that apportionments had to be made when such properties were divided by sale or letting, an Amendment Act was passed in 1840 under which field apportionments were made the rule.

Apportionment.—In subdividing his property into plots for building purposes, an owner may take upon himself to pay the tithe rent-charge, and to collect the amount in small sums from the several lessees or purchasers who have acquired plots. This method cannot, however, be recommended, as, in the absence of a formal apportionment, the full amount of tithe rent-charge for the entire holding or enclosure, as the case may be, is legally due from any one owner of any portion, and who, if it is claimed from him, is obliged to pay, and collect as best he can the *pro rata* sums that should be paid by the other owners.

Where it is proposed to develop a block of land forming part of an original tithe holding, and comprising the whole of one or more tithe numbers, a formal apportionment should first be obtained and the charge redeemed, but where a field apportionment is available, the tithe on each complete number may be redeemed without an apportionment. If the field is divided into a large number of building sites and sold, the cost of effecting a re-apportionment among the several owners becomes a rather laborious and expensive matter, which is further complicated by the fact that the Board of Agriculture will not sanction the re-apportionment of a smaller sum than 5*s.* to any portion of such field.

Redemption.—For re-apportionment or redemption of tithe rent-charge, application should be made to the Board of Agriculture for the necessary forms. As, however, the amount of the charge does not increase with the improvement of the land, the redemption is often allowed to stand over until after a property has been covered with houses, the owner in the meanwhile contracting with the purchasers of the several plots that he will continue to pay the rent-charge until it is redeemed, at his own cost. The price to be paid for redemption is fixed at twenty-five years' purchase of the commuted amount, which represents some 35¾ years' purchase of the current (1910) value of the charge, or a return of about 2·8 per cent., as an investment.

Redemption is compulsory where the land is being taken for certain public purposes, as for the erection of a church, school, &c., or for use as a public recreation ground or cemetery. The Board may also order redemption if the tithe rent-charge is less than 20*s.*, upon the application of either the tithe owner, or the land-owner, and if over 20*s.*, upon the joint application of both parties.

Land Tax.—Unlike tithe rent-charge, the apportioned amount of which is fixed, the sum charged for land tax increases with the improved value of land, hence the necessity of effecting a redemption of the tax before proceeding with the development of a property. As an example in point, a field, the gross annual value of which is £20, is assessed at 9*d.* in the £, or 15*s.* per annum, but after development the gross value is increased to £120, and the land tax assessed at 6*d.* in the £ amounts to £3 per annum. On the basis of the original undeveloped value the redemption money would be (15*s.* × 30) £22 10*s.*, but after development this would amount to (£3 × 30) £90.

Under the Finance Act, 1896, the maximum rate of land tax was fixed at 1*s.* in the £ on the gross annual value as assessed for property tax, the minimum rate being fixed at 1*d.* in the £. In the case of parishes that were previously assessed below the minimum rate mentioned, provision was made in the Act that the surplus which would thus be contributed in excess of the quota originally chargeable, should be applied towards the redemption of the quota, so that in course of time the land tax charge will be totally extinguished in such parishes. The actual reduction of the quota is taken at one-thirtieth part of the excess when over £5.

Redemption.—In parishes where this surplus is being applied towards the extinguishment of the quota, redemption can be secured on the basis of a charge which, at such a fraction of a penny in the £, would suffice to raise the applicant's share of the quota according to the valuation of his property. Under these circumstances redemption can be effected at less than thirty times the tax charged, varying, of course, according to the amount of the surplus produced by the imposition of the penny rate. Taking, for example, a property assessed in £120 at 1*d.* in the £, thus representing a payment of 10*s.* per annum, but where a rate of ½*d.* in the £ would be sufficient to make up the quota. The redemption money would then be computed on the basis of £120 at ½*d.* = 5*s.*, and which, at thirty years' purchase, would amount to £7 10*s.*, thus representing fifteen years' purchase only of the actual annual payment.

By the Act above referred to the consideration for the redemption of land tax was fixed at thirty times the amount of the tax which it is desired to redeem, and the amount may be paid: (1) in one sum; (2) by four equal instalments of not less than £5 each; or (3) by annual instalments of not less than £60 in any period exceeding four but not exceeding sixteen years. When paid by instalments, it was enacted that interest at the rate of 3 per cent. per annum, on so much of the capital sum as remains unpaid, should be payable with each instalment, but the instalments remaining unpaid might be paid at any time within the period allowed.

Procedure for Redemption.—The redemption of land tax is carried out through the Registrar of Land Tax, Land Tax Redemption Office, Somerset House, London, W.C., the process, as explained on the official form, being briefly as follows:—

Any person having an estate or interest in the land, other than a tenant at rack rent, being desirous of contracting for the redemption of the land tax charged upon his property, must (either personally or by his authorised agent) attend before the Clerk to the Land Tax Commissioners for the division in which the property is situate, and sign a Form of

Declaration, producing at the same time either a full description of the property proposed to be exonerated, giving its area and boundaries, and any other details which will assist in its future identification, or the tithe or Ordnance numbers relating to it, or else a plan showing the extent and position of the property. If a plan be used—as is preferable, though not obligatory—it must be in duplicate, one copy to accompany the certificate of the contract, and the other to be attached to the registry thereof at the Land Tax Redemption Office.

The clerk will thereupon attest the signature to the Declaration, and, on a special form, certify the amount of land tax charged upon the property proposed to be exonerated. Both documents, with plans (if any), will be forwarded by the clerk to the Registrar of Land Tax, who will prepare a Certificate of the Contract to be signed by the Commissioners of Inland Revenue, provided the documents are made out in accordance with the requirements of his office. The contract so entered into will, under the provisions of the Land Tax Redemption Acts, be binding upon the contractor. In due course the Registrar of Land Tax will notify to the contractor, or his agent, the amount of the consideration, which must be paid to the Accountant-General of Inland Revenue at Somerset House, London, W.C. No payment thereof can be legally made except in pursuance of such notice, and to the offices named therein, no other person having any authority to receive the money. Upon the money being paid, the contract will be registered, after which it will be forwarded to the contractor, or his agent, further endorsed with a Certificate of Registration, and of the period from which the property will be exonerated from land tax.

No person is authorised to charge the public with any fee for certificate of assessment, or other proceedings, in the redemption of land tax.

The land tax may be redeemed by limited owners, but the property may not be exonerated, in which case the annual sum originally redeemed is paid by the Government to the representatives of the redemptioner, but such mode of redemption is only of advantage to leaseholders, and is seldom adopted.

Copyhold Properties.

Customs and Payments.—These properties are held subject to manorial customs and the payment of quit rents, free rents, or other annual rents, services or payments, the payment of fines and heriots, sporting, timber, or manorial rights, all of which tend to fetter the subdivision and development of the land into building plots. The annual value of building land, before development, is usually taken at one-twenty-fifth part of its fee-simple value, but after houses have been erected upon it, the annual value would be represented by the gross annual value for the poor rate assessment, which would, of course, include that of the houses. The annual value would thus be very materially increased, and the amount of compensation payable in respect of enfranchisement would be proportionately augmented. Moreover, the several tenements may each be subjected to separate heriots, and also to separate fines, while a licence may have to be obtained before the copyholder can lease any portion of his property. Under these circumstances it is very desirable that copyhold properties should be enfranchised before building operations are commenced, and under the Copyhold Act, 1894, enfranchisement is made compulsory at the option of either lord or tenant.

Enfranchisement.—The amount of compensation payable in respect of enfranchisement varies in different manors, but the principle of assessment adopted, and that on which the table issued by the Board of Agriculture is based, in ordinary cases may be briefly stated as follows :—

Fines.—When an arbitrary fine is payable on alienation by, as well as on the death of, a tenant, the compensation is generally computed on the basis that a fine not exceeding two years' annual value of the property is payable on each change of tenancy, with an average fine interval of fourteen years, due regard being also paid to the age of the tenant, i.e. the present value of the fine assumed to be payable at the end of every fourteenth year by a tenant aged twenty-nine years, is equivalent to three years' purchase of the fine value.

Where the fine is certain, or is payable only on death and not on alienation, or *vice versa*, one year's annual value of the property is usually taken as the basis of computation, and one-half the number of years given in the table is applied. The amount of compensation for a relief is calculated in the same manner.

The gross annual value of the property for the poor rate assessment may be used for ascertaining its annual value, and no deduction should be made for land tax, but the quit rent should be deducted, and where there are buildings, allowance should be made for keeping them in repair.

Heriots.—The value of a heriot may generally be ascertained from the average value of the last three heriots taken or paid in respect of the property to be enfranchised. If payable on the death of the lord, as well as on alienation by, or death of, the tenant, the compensation should be proportionately increased.

Quit and other Rents.—The compensation for quit rents, free rents, and other annual rents, services, or payments, should be calculated at twenty-five years' purchase.

Timber.—If the lord is entitled to enter upon the land and cut and carry away timber without the consent of the tenant, the full value of the timber, after making an allowance for repairs, is taken as the basis of the lord's compensation; but if the lord cannot enter and cut the timber without first obtaining the consent of the tenant, one-half only of its value is included, after making an allowance for repairs as before.

Minerals.—In many cases the minerals are reserved to the lord of the manor in order that the continuity of the underground workings shall not be interrupted. In the case of building properties, however, efforts should be made to get the surface minerals to a depth of some thirty to fifty feet—the maximum allowed by the Ecclesiastical Commissioners is 200 feet—included in the enfranchisement, so that any beds of stone, gravel, sand, or brick-earth comprised in the property might be utilised in its development. Compensation for such surface minerals may be computed on an acreage basis, and may vary from 5*s.* to £1 per acre.

Forfeitures.—The compensation for forfeitures, and all other incidents of copyhold tenure not previously mentioned, should not exceed 20 per cent. of the annual value of the property.

Assessment of Compensation.—The practical application of the preceding rules is shown in the following example, which applies to a property of ten acres of building land with house, tithe free, and together of the fee-simple value of £400 per acre, but subject to an arbitrary fine on alienation by, as well as on death of, the tenant :—

To find the Annual value :—	£	*s.*	*d.*	£	*s.*	*d.*
10 acres at £400 = £4000 ÷ 25, gross annual value ..				160	0	0
Deduct :—						
Quit rent	0	10	0			
Repairs (say) ..	10	0	0	10	10	0
Nett annual value				£149	10	0

Compensation :—

	£	*s.*	*d.*	£	*s.*	*d.*
Age of tenant, 29 years, the compensation for fines therefore = £149 10*s.* × 3 ..				448	10	0
Add :—Quit rent 10*s.* at 25 years' purchase	12	10	0			
Heriot, for which previous payment was £20, ∴ £20 at 1½ years' purchase	30	0	0			
Timber (say)	5	0	0			
Surface minerals at 20*s.* per acre	10	0	0			
Forfeitures and other incidents of tenure (say) ..	10	0	0	67	10	0
Total amount of lord's compensation				£516	0	0

In addition to the above amount of compensation, the tenant would have to discharge the steward's compensation, (say) £11 10*s.*, stamp duties ; valuer's fees ; plans, &c.

Time to Enfranchise.—If the enfranchisement were deferred until the development had been completed, the gross annual value might be from £1500 to £3000, instead of £160 as above, and the amount of compensation to be paid would be proportionately increased.

On the other hand, the question may well be asked whether it would not have been to the tenant's interest to have enfranchised the land before it had acquired a building value of £400 per acre. But the property might have been in the hands of trustees, or the lack of funds, or other circumstances beyond the control of the tenant, may have necessitated the enfranchisement being deferred. However this may be, the foregoing example will be sufficient to show that the selection of a time when, in the interests of the tenant, the necessary steps should be taken for enfranchisement, is a matter which calls for the careful consideration of the person who is responsible for the management of the property.

The mode of procedure for compulsory enfranchisement is set out in the Minute as to proceedings under the Copyhold Act, 1894, together with scale of compensation and tables, prepared by the Board of Agriculture under Section 66 of the Act.

Rates.

Basis of Estimate.—In estimating the value of land for the assessment of the poor and other general rates, the prospective element of building potentiality is not taken into account, as in the case of a valuation for estate, or undeveloped land duty.

Gross Estimated Rental.—As with other real property, the *gross estimated rental* of land suitable for building development is ‘ the rent at which the property might reasonably be expected to let from year to year, free of all usual tenant’s rates and taxes, and tithe rent-charge (if any) ’ (25 & 26 Vict. c. 103). Having regard to the fact that the letting contemplated is one from year to year, the prospective value of property could not reasonably be taken into account. In the words of Lord Justice Lush : ‘ The rateable quality of property is not to be determined by what it once was, or may hereafter become. If a piece of fertile land were to be covered by the ashes of a volcano or by an inundation, it would have no rateable value so long as it continued in that condition. So also, on the other hand, a barren rock, so long as it remains a barren rock, has no rateable value ; but the moment it is worked as a quarry it becomes rateable. The rateable quality of property must be determined by what it is at the time the rate is made.’ (*Metropolitan Board of Works* v. *West Ham*, L.R. 6, Q.B. 193.)

‘ If,’ as Justice Blackburn said, ‘ the prospective value were taken into account, the result would be that if a man was driving a shaft with the expectation of meeting a valuable vein of minerals, he would be rateable upon some probable value for those minerals before he ever reached them, and though he was deriving no benefit whatever from his labour and expense. The law is not so, but the legislature intended that the rate should be made upon the rent which might reasonably be expected from a tenant who took the property from year to year. . . . If there be waste land near a large city which is entirely unprofitable, it is not rateable, though in after years it might become exceedingly valuable.' (*Staley* v. *Castleton Overseers*, 33 L.I.M.C., p. 182.) The basis of assessment is, therefore, the value to an occupier in its existing state, *rebus sic stantibus.*

Where the property is let to a tenant the rent actually paid is *prima facie* the letting value, but it is not conclusive. In the case of property in the hands of its owner, the gross estimated rental of such property can only be estimated, and for this purpose the amount of the usual tenant's rates and taxes, together with the tithe, must first be ascertained; for any intending tenant would calculate the amount of the burthens which he would have to pay, before he could see what rent he could afford to give for the property.

The usual tenant's rates and taxes to be deducted before arriving at the gross estimated rental of any property include poor rate, highway rate, education rate, sewers' rate, county rate, borough rate, and other local burthens chargeable on the occupier. Land tax does not form a deduction (*Reg.* v. *Goodchild*, 27 L.I.M.C. 233); nor are rates voluntarily paid for a supply of water or gas (*Reg.* v. *Bilston*, L.R. 1, Q.B. 18). Inhabited house duty is clearly a tenant's tax, and should therefore be deducted.

Rateable Value.—The *rateable value* of any property is the amount of the *gross estimated rental* after deducting therefrom the average annual cost of the repairs, insurance and other expenses necessary for maintaining the property in a state to command such rent (6 & 7 Will. IV. c. 96). The rates of deduction allowed to cover the cost of repairs, insurance, &c., vary in different counties, but the maximum allowance under the Valuation (Metropolis) Act, 1869, for agricultural land with buildings is 10 per cent., and for land without buildings 5 per cent.; while for the county rate assessment in the Eastern Counties the deductions are as follows :—

		Per cent.
1.	Land without buildings	2½
2.	Land with buildings not exceeding £50 rental	15
3.	,, ,, ,, £100 ,,	12½
4.	,, ,, ,, £200 ,,	10
5.	,, ,, exceeding £200 ,,	7½

Agricultural Rates Act.—Under the Agricultural Rates Act, 1896, all agricultural land—which includes any land used as arable, meadow, or pasture ground only, cottage gardens exceeding one-quarter of an acre, market gardens, nursery grounds, orchards, or allotments, but does not include land occupied together with a house as a park, gardens other than cottage gardens or market gardens, pleasure grounds, or any land occupied or preserved mainly or exclusively for purposes of sport or recreation, or land used as a racecourse—is to be assessed to or to pay in the proportion of one-half only of the rates payable in respect of buildings and other hereditaments. This relief does not apply in the case of general district rates, or such special charges as are assessed under any commission of sewers, or in respect of any drainage, wall, embankment, or other work for the benefit of the land.

Where any hereditament consists partly of agricultural land and partly of buildings, the gross estimated rental of the buildings is to be estimated separately from the land on the basis of the rent at which the buildings might be expected to let to a tenant from year to year, if they could only be used for the cultivation of the land.

General District Rate.—In the case of the general district rate ‘ any land used as arable, meadow, or pasture ground only, or as woodlands, (orchards, allotments,) market gardens, or nursery grounds . . . shall be assessed . . . in the proportion of one-fourth part only of such net annual value thereof' (38 & 39 Vict. c. 55, s. 211, and 53 & 54 Vict. c. 17, s. 1).

From the foregoing statements it will be seen that while land continues to be used for agricultural or other allied purposes during the period it is maturing for building development, it should be assessed as agricultural land, and is entitled to the relief provided under the Agricultural Rates Act for such land. If the property should be occupied or preserved mainly or exclusively for gaming purposes, it would not come within the limits of the Act.

Advertisement Stations.—Under the Advertising Stations (Rating Act), 1889, unoccupied land that is used either temporarily or permanently for advertisement purposes, may be assessed in respect of such usage; and where land is occupied for other purposes, and is also used temporarily or permanently for the exhibition of advertisements, the gross and rateable values are to be estimated so as to include the increased value from such use (52 & 53 Vict. c. 27, s. 4).

PROPOSED DUTIES ON LAND VALUES.

The proposals contained in the land clauses section of Mr. Lloyd George's Finance Bill, 1909, materially affected the sale of building properties during the time which elapsed between the introduction of the Budget and the formal refusal of the House of Lords to sanction the measure, chiefly on account of the feeling of insecurity which they imparted to potential purchasers, in consequence of :—

(1) The novel principles on which the proposals were based ;
(2) The uncertainty of incidence of the proposed duties ; and
(3) The possibility of the Bill being ultimately rejected by the Upper House.

The proposals were debated at considerable length in the House of Commons, and important alterations and modifications were made to them. In spite of such amendments, however, the Bill was virtually rejected by the House of Lords.

Although such proposals were thus rendered inoperative, the fact that they, nevertheless, indicated the views of a rather numerous class of social reformers was evidenced by the result of the General Election. As seemed probable legislative sanction has since been obtained for them, and it thus becomes necessary to carefully consider the bearing of the proposed duties, and to show, by means of examples, the probable effect which their practical application may have on the returns obtainable from building properties.

Duties to be Levied.

The duties that are to be levied on land values consist of :—

(1) Increment value duty ;
(2) Reversion duty ;
(3) Undeveloped land duty ;
(4) Mineral rights duty.

(1) Increment Value Duty.—This duty, which is at the rate of 20 per cent., is to be chargeable on the amount by which the *site value of land,* other than agricultural land, small ownerships, properties belonging to local authorities or statutory companies, or

that is being held for public or charitable purposes, is found to exceed its original site value, on either of the following occasions:—

(*a*) The sale of the fee-simple or any interest therein;
(*b*) The grant of a lease for a term of not less than fourteen years;
(*c*) The death of an owner causing the passing of the property into other hands;
(*d*) In the case of corporate or unincorporate bodies, the estimated value at the end of every fifteenth year.

Where an owner proves to the Commissioners that his land has been purchased within twenty years before April 30th, 1909, for an amount in excess of the present site value, such sum is to be substituted for the present site value of the land, and the duty adjusted accordingly. A corresponding concession is made in regard to mortgagees.

Where increment duty has been paid on an original site value, it is not to be again chargeable until the property has been sold at such a sum as shall be at least 10 per cent. in excess of such original site value, and when the duty is to be charged upon so much of the increase only as exceeds 10 per cent.

Agricultural land, which includes that used as meadow, or pasture land, or woodland, or for market gardens, orchards, osier-beds, nursery grounds, or allotments, is exempt while such land has no higher value than its market value for agricultural purposes.

The small ownerships exempted comprise land forming the site of any dwelling-house of an annual value (Income Tax Sch. A.) not exceeding £40 in London, £26 in urban districts of 50,000 population or over, and £16 elsewhere; also agricultural holdings of not more than fifty acres in extent, and the value not more than £75 per acre, provided such properties have been occupied by the owners for at least twelve months immediately before the occasion on which the duty is to be collected.

This duty is payable by the owner of the land, except in the case of a lease having more than fifty years still to run, when it is payable by the lessee.

(2) Reversion Duty.—This duty is to be payable on the determination of any lease of land, other than agricultural land, for a period exceeding twenty-one years, at the rate of 10 per cent. on *the value of the benefit accruing to the lessor* by reason of the determination of the lease. The value in this case is to be the amount (if any) by which the total value of the land at the time the lease determines exceeds the capital value of the consideration for the original grant of the lease, after allowing for any improvements that may have been effected during the term at the lessor's expense, or any compensation payable by him at the termination of the lease; but where the lessor is not the freeholder the estimated value of the benefit is to be proportionately reduced.

All reversions purchased prior to April 30th, 1909, on which the reversion is expectant within forty years of the date of such purchase, are to be exempt from reversion duty.

It will be observed that, although no reference is made to buildings in the Act, the value of the benefit accruing would not, presumably, be restricted to the land, but would also include the reversionary value of any building that may be on the site at the expiration of the lease. Taking the case, therefore, of the reversion to a site that had been let at a ground rent of £10 per annum, which, without any expenditure on the part of the lessor, has been re-let since April, 1909, at a ground rent of £20 per annum. The duty here would be leviable on the increased rent of £10 per annum, and which, at twenty-five years' purchase, shows a capital sum of £250. Taken at 10 per cent. on this capitalised figure the duty would work out at £25.

(3) UNDEVELOPED LAND DUTY.—This duty is to be payable annually by the freeholder, or lessee of lease having more than fifty years to run, at the rate of ½*d.* per £ on the site value of undeveloped land. The term 'undeveloped land' is defined as land that 'has not been developed by being built upon, or by being used for any business, trade or industry other than agriculture, or, if having been so developed the land ceases to be used for the purpose of such development, it again becomes undeveloped land after the expiration of one year.' Where an owner has spent sums at the rate of at least £100 per acre on roads or sewers for purposes of development within the preceding ten years, such land is not to be treated as undeveloped land, although it may not be built upon or used for business purposes.

To the foregoing rules there are the following exceptions:—

(*a*) The duty is not payable on land, the site value of which does not exceed £50 per acre;

(*b*) In the case of agricultural land exceeding that value, such as market gardens, &c., the duty is not chargeable in respect of any such excess that is due to the value of the land for agricultural purposes only;

(*c*) On the site value of any woodlands, parks, gardens, or open spaces to which the public have access, or of any land which is *bona fide* used for the purpose of games (including golf courses that are laid out) or other recreation for the benefit of the public, or the inhabitants of the locality, under a lease of not less than five years, or under other circumstances which render it probable that the land will continue to be so used ;

(*d*) On the site value of any gardens or pleasure grounds not exceeding one acre in extent when occupied with a dwelling-house ; and also grounds not exceeding five acres if occupied with a dwelling-house, and the site value does not exceed twenty times the annual value of the house and grounds for income tax ;

(*e*) On the site value of agricultural land held under lease or agreement entered into before April 30th, 1909, for a term exceeding one year, but not exceeding twenty-one years, provided that the tenancy of the whole or any part of the land cannot be discontinued at the option of the landlord ;

(*f*) On the site value of any land kept free of buildings in pursuance of a definite scheme applicable to an area of which the land forms part, or in view of the character of the surrounding neighbourhood ; but land so exempted shall not be built upon except with the consent of the Local Government Board.

Where increment duty has been paid, the value on which undeveloped land duty is to be assessed, is to be reduced by five times the amount paid for increment duty.

(4) Mineral Rights Duty.—This duty is to be payable annually and is charged at the rate of 5 per cent. on mineral rents, which include not only royalties, but dead rents and wayleaves, payable in respect of minerals which are actually in course of being worked. This duty will not have any direct effect on building land, more particularly as limestone, gravel, sand, chalk, and clay are exempted.

Application of Duties.—One-half of the proceeds of the several duties is to be paid to the Local Authorities for the relief of the local rates.

Method of Valuation.—In order to assess the duties referred to, the Commissioners of Inland Revenue have to make a valuation of all the land in the United Kingdom, as soon as possible after the passing of the Bill. Each piece of land under separate occupation, and, if required by the owner, any part of any land under separate occupation, is to be separately valued. The valuation is to show separately the 'total value' and the 'site value,' and, in the case of agricultural land, the value of the land for agricultural purposes when that value is different from the site value, the value in each case to be estimated as on April 30th, 1909.

Owners of land and persons receiving rent for it are, on receiving notice, to furnish the Commissioners with information as to ownership, tenure, area, character, and use of the land, and any other matter which may properly be required, within a specified time, which is not to be less than thirty days. The Commissioners are then to make a provisional valuation and send a copy to the land-owner, who may lodge an objection within sixty days, otherwise the provisional valuation will determine the 'original site value,' or settled basis of the assessment. If an objection be lodged and the provisional valuation be not amended so as to be satisfactory to the objector, he may appeal first to a referee, and subsequently either to the High Court, or, where the value is less than £500, to the County Court.

For the purposes of the duty on undeveloped land the Commissioners are to make a periodical valuation every five years, beginning with 1914.

Definitions of Values.—It will be observed that the duties are proposed to be levied on the capital value of land that is more or less suitable for building, instead of on its annual value, as previously adopted for assessment purposes. In order to facilitate the new mode of procedure the capital value is to be subdivided as follows :—

(1) The '*gross value,*' which is defined as 'the amount which the fee simple of the land, if sold at the time in the open market by a willing seller in its then condition, free from incumbrances and from any burden, charge, or restriction (other than rates and taxes) might be expected to realise.'

(2) The '*full site value,*' which is given as 'the amount which remains after deducting from the gross value of the land the difference (if any) between that value and the value which the fee simple of the land, if sold at the time in the open market by a willing seller, might be expected to realise if the land were divested of any buildings, and of any other structures (including fixed or attached machinery) on, in, or under the surface, which are appurtenant to or used in connection with any such buildings, and of all growing timber, fruit trees, fruit bushes, and other things growing thereon.'

(3) The '*total value*' of land means 'the gross value after deducting the amount by which the gross value would be diminished if the land were sold subject to any fixed charges, and to any public rights of way,' or of user, and to any other easements or restrictions affecting the land.

(4) The '*site value*'[1] or '*assessable site value*' means the total value after deducting therefrom the difference between 'full site value' and 'gross value,' and for capital expenditure made on the improvement of the land for building, or for business, trade or industrial purposes other than agriculture; for any value acquired by the appropriation of other land belonging to the same owner for the use of the public, for the cost of redeeming land tax and other fixed charges, or of enfranchisement, or of effecting a release from restrictive covenants; and for the expenditure necessary to divest the land of buildings, trees, and other things growing thereon.

Let A = fee-simple value of land, free from all incumbrances, fixed charges, burdens, or restrictions, cost of improvements, &c.

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[1] The term 'site value' is synonymous with 'assessable site value' throughout the Act, except in regard to the assessment of increment value duty payable on, (*a*) the transfer on sale of the fee simple, (*b*) the grant of a lease or transfer on sale of any interest in the land, and (*c*) where the fee simple passes on death. The 'site value' of properties in the (*a*) or (*b*) classes is stated to be the value of the consideration for the transfer or grant; while in regard to (*c*), the 'site value' is to be the principal value as estimated for the purpose of the Finance Act, 1894, but subject in each case to the like deductions that are allowed under Sec. 25 for arriving at the 'assessable site value.'

The 'assessable site value' of properties belonging to bodies corporate or incorporate, which have to be valued periodically, is to be computed from the 'total value,' after making the deductions allowed under the general provisions as to valuation previously stated (sec. 2).

Let B = capitalised value of fixed charges payable in respect of the land, other than rates and taxes.

C = capital value of existing buildings, machinery, growing timber, fruit trees, bushes, and tenant's improvements.

D = depreciatory capital value of public rights of way, or of other easements and restrictions.

E = capital expenditure on permanent improvements, building development, and clearance of site.

F = capital expenditure on the redemption of tithe, land tax, or other fixed charges, and enfranchisement.

Then—

'Gross' value $= A$.

'Full site' value $= A - C$.

'Total' value $= A - (B + D)$.

'Site,' or 'assessable site' value

$$= A - [C + D + E + (B \textit{ or } F)].$$

Comparison of the Several Values.—For the purpose of illustrating the practical application of the foregoing definitions, we may take the case of an undeveloped block of twenty acres of land that is eligible for building purposes, and the management of which has been directed to that end. A length of 1000 feet of road has been formed and sewer laid, the tithe and land tax have been redeemed, and the land is at present let under yearly tenancy (subject nevertheless to twenty-eight days' notice for any portion required for building) for market gardening purposes, at a rental of £100 per annum.

	£	£
Gross value of land, 20 acres estimated at £500 per acre		10,000
Deduct :—		
Agricultural value, £100 at 25 years' purchase	2,500	
Cost of survey, preparation of plan and scheme of development, and supervision of improvements	150	
Cost of redemption of tithe and land tax	250	
Cost of formation of new road and sewer	1,500	
Cost of diverting public footpaths ..	100	
Cost of ornamental plantation belts and other preparatory improvements ..	200	
Value of growing timber	100	
Compensation for tenant-right ..	200	5,000
Assessable *site value* of land for undeveloped land duty		£5,000

In the foregoing example it will be seen that the *assessable site value* works out at the rate of £250 per acre, or 50 per cent. less than the *gross value* of the land.

It will also be observed that the actual expenditure made on road formation amounts to £1500, or an average of £75 per acre, for the whole property. If the outlay had been equal to at least £100 per acre, or a capital sum of £2000, the property would have been entitled to exemption from undeveloped land duty. In some cases the expenditure might be made applicable to a portion only of a property, and in the preceding example the outlay would be sufficient to release fifteen acres, thus leaving only the remaining five acres chargeable with undeveloped land duty.

In estimating the *assessable site value of building land* for increment value duty, no deduction should be made for the agricultural capabilities of the soil, as in the case of undeveloped land duty. The *original site value*, for increment duty, of the property comprised in the preceding example might, therefore, be placed at the sum of £5000, plus £2500 deducted for agricultural value, thus amounting to £7500 ; and the ‘ original gross value ’ at £10,000.

If at the end of three years the property were sold for £12,000, without any further expenditure having been made, the unearned increment would be represented by the difference between the ‘ original site value ’ of £7500, and the sum realised, £12,000, less the outlay on development £2500, and thus amount to £2000. In order to arrive at the taxable increment, a further deduction of 10 per cent. of the ‘ original site value,’ or £750, should be made, which would leave the sum of £1250 subject to the 20 per cent. duty.

It will be observed that no deduction has been made for loss of interest during the three years, it being assumed in the Act that this loss will be covered by the allowance of 10 per cent., plus the returns obtainable from the property in the shape of rent.

Formulation of Estimate.—The valuation of land which possesses an element of building value is at all times a somewhat difficult problem, and, having regard to the requirements of the Finance Act, and the proposed duties payable thereunder, the question will naturally arise as to whether an owner's interests will be best served if a comparatively low estimate of the present value of his property be adopted, or whether its potentialities for building should be fully appreciated. An inflated estimate would increase the amount of the annual charge of $\frac{1}{2}d.$ in the pound leviable on the property, but, on the other hand, it would proportionately reduce the amount of increment value on which duty would become payable in case of transfer.

Taking, for example, a block of land, the present capital value of which may be £400 per acre, but which is returned at £300, and which block is sold four years hence at £450 per acre, the result may be computed as follows :—

	£	*s.*	*d.*
Undeveloped land duty—			
Assessed on £300 at $\frac{1}{2}d.$ in the £ = 12*s.* 6*d.* per annum, for four years	2	10	0
Increment value duty—			
Assessed on £450, less £300 + £$\frac{300}{10}$ or £330 = £120 at 20 per cent.	24	0	0
Amount of duties payable, per acre	£26	10	0

If the land were returned at £400 per acre, the following result would be obtained :—

	£	*s.*	*d.*
£400 at $\frac{1}{2}d.$ in the £ = 16*s.* 8*d.* per annum, for four years	3	6	8
Increment value £450, less £400 + £$\frac{400}{10}$ or £440 = £10 ; duty on £10 at 20 per cent.	2	0	0
Amount of duties payable, per acre ..	£5	6	8

If the land realised £400 only, instead of £450, the amount of the undeveloped land and increment value duties payable would be £16 10*s.* in the first case, and £3 6*s.* 8*d.* in the latter, per acre, respectively.

Again, if the land realised £300 per acre, instead of £450, no increment value duty would be payable in either case, but the undeveloped land duty on the return of £300 would amount to £2 10*s.*, and on that of £400 the sum of £3 6*s.* 8*d.*, per acre, respectively.

From the foregoing computations it will be seen that, where land is likely to increase in value, it will be to the owners' advantage for the full value to be appreciated, at least while the undeveloped land duty remains at ½*d.* in the pound. If, however, the value of the land is diminishing, and there is little probability of its again realising the sum paid for it, if purchased since April 30th, 1889, the minimum present value might well be adopted.

In this connection it should not be forgotten that there is the probability that the annual duty may be raised in the near future ; while, in case of the owner's death, advantage could be taken of his estimate of capital value in the assessment of estate duty.

Compulsory Purchase.—Such an estimate might also be utilised for purposes of expropriation, as, under the provisions of the Housing and Town Planning Act, local authorities may be authorised to purchase compulsorily any of the land comprised in a town planning scheme. The basis of compensation-value is left an entirely open matter, and no additional allowance is to be made on account of the purchase being compulsory.

Although the Finance Act provides that the returns to be made by land-owners are for the purpose of administering that measure, no specific provision is made to prevent local authorities availing themselves of such information when desirous of acquiring land, or of endeavouring to purchase on the basis of the owner's estimate of capital value. Indeed, according to the Right Honourable D. Lloyd George, ' the new state valuation must be the basis of all plans for communal purchase.' Having regard, therefore, to the probability that urban authorities may, in the near future, acquire the power to purchase, on the basis of its assessment for purposes of taxation, any land scheduled for the extension of their towns, or that will be required for the construction of new roads by the Road Board, it will be advisable for an owner to appreciate its potentialities in forming his estimate of capital value for the assessment of land duties. Viewed from a comprehensive standpoint, it will be obvious that the valuations of building land to be made under the Finance Act will be pregnant with the most important consequences to owners.

Although of the two, the *Assessable site value* may, for the moment, seem to be of greater importance, having regard to its direct bearing as the basis of assessment—with certain deductions—for increment value, as well as for undeveloped land duties, the probability that the *total value* will be used for the purposes of expropriation undoubtedly renders the estimation of such latter value a matter for very careful consideration.

Capital Value Assessment.—While the principle of assessing properties on the basis of their capital value has been partially adopted in our Australian colonies, as well as in Canada, for some years, it, nevertheless, partakes of the nature of an experiment in this country. Under these circumstances, and especially having regard to the singularly complex nature of the interests in land in the United Kingdom, no reliable rules can be laid down for the guidance of land-owners. Each case must necessarily be considered on its own merits. Taking into account, therefore, the far-reaching effect which an owner's declaration of value may have on his pecuniary interests, he will, as these Budget proposals have now received legislative sanction, be well advised to seek the assistance of some expert on the subject of building-land development before rendering any valuation of his own property. It may, indeed, be well for him to procure such assistance in dealing with any doubtful points that may arise in furnishing returns to the Commissioners, as well as for the purpose of meeting the representatives of the Government, to ensure proper values being fixed.

Property Tax.—As a partial set-off against the new land duties introduced by the Finance Act, 1909, the owners of agricultural estates are to be allowed, in their assessment to Schedule A of the Income Tax, to deduct for maintenance, repairs, insurance, and management, up to 25 per cent. of the annual rental, in cases where it can be proved that the average expenditure during the five preceding years has been equivalent to, or more than, that percentage, instead of one-eighth in the case of land, and one-sixth for buildings, as previously allowed.

CHAPTER II

EXTENT AND NATURE OF DEMAND FOR BUILDING LAND

The demand for building land is primarily dependent on—

I.—The rate of increase in the population, whether by birth or migration.
II.—The area of land per head necessary to meet the requirements of such increase.

I.—The Rate of Increase in the Population.

There is a wide difference in the rates of growth of the population of different towns, more particularly of those which are situated in the midst of mining or manufacturing centres, such, for instance, as Middlesbrough, which nearly doubled its population at each decade between 1851 and 1871; or those suburbs that offer special advantages to the working classes in the form of exceptionally cheap travelling facilities as well as suitable accommodation, as in the case of Walthamstow, where the population increased from 11,092 in 1871 to 95,131 in 1901.

Chiefly on account of the limited area of land available for house-building in the largest towns, including London, the average rate of increase of population between 1891 and 1901, within their boundaries, was below that of the whole of England and Wales, although in towns having populations between 100,000 and 250,000 the average rate of increase was 17·7 per cent., in those with populations between 50,000 and 100,000 it was 23·1 per cent., and between 10,000 and 20,000 it was 18·4 per cent.

The most remarkable instances of high rates of increase in urban districts were 193·5 per cent. in East Ham, 105·3 in Walthamstow, 101·8 in Kings Norton and Northfield, 87·4 in Willesden, 61·8 in Hornsey, 61·6 in Handsworth, and 56·7 in Leyton. It will be observed that these exceptional rates of increase were in places adjacent to some large centre of industry, and may, therefore, be attributed to an overflow of population into the respective suburbs rather than to any abnormal increase in the birth-rate.

In the more important county boroughs the returns in 1891 and 1901, and the rate of increase for that period, were as follows :—

Borough.	Population 1891.	Population 1901.	Rate of increase, per cent.
Liverpool	629,548	684,958	8·8
Manchester	505,368	543,872	7·6
Birmingham	478,113	522,204	9·2
Leeds	367,505	428,968	16·7
Sheffield	324,243	380,717	17·4
Bristol	289,280	328,945	13·7
Bradford	265,728	279,767	5·3
West Ham	204,903	267,358	30·5

Among other county and municipal boroughs, the following call for special mention in respect of the high rate of increase in the population, viz. :—

Borough.	Population 1891.	Population 1901.	Rate of increase, per cent.
Smethwick	36,106	54,539	51·1
West Hartlepool	42,815	62,627	46·3
Ealing	23,979	33,031	37·7
Croydon	102,695	133,895	30·4
Cardiff	128,915	164,333	27·5
Middlesbro'	75,532	91,302	20·9

It is worthy of note that among the 1,122 urban districts, seventy-five had in 1901 a population exceeding 50,000. The average increase in population in these seventy-five towns between 1891 and 1901 was 14 per cent. as compared with 12·2 per cent. by which the entire population of England and Wales increased in the same period.

Effect of Increased Population on Development.—As a rule, a high rate of increase implies a proportionately keen demand for building land, and such demand, springing from the realised need of additional accommodation, will naturally follow and not precede the increase in population. In theory, the rate of development should be commensurate with that of the increase in population, but in practice it is generally found that while in the early stages of the growth of a town the rate of development is proportionately less than the rate of increase, yet having once become established, such rate of development is usually maintained for some considerable time after the rate of increase in the population has begun to diminish. Where, after an exceptionally prosperous period, a town reaches its zenith, and the rate of population begins to drop, it is probable that under the rate of development, which has become established, more houses will continue to be built than will be required until the law of supply and demand has once more adjusted itself. This involves a period of waiting, during which the town is said to be suffering from 'over-building,' and which lasts until the increase of demand has raised the rent standard to a point at which building again becomes profitable.

Extension of Business Premises.—In some instances, of which the City of London forms the best-known example, the keen demand for sites for business premises has effected a marked decrease in the population. In 1891 the city had a population of 37,702 persons, but in 1901 that number had been reduced to 26,923. Finsbury also might be mentioned as forming a notable example where the population has declined during recent years, in consequence of the encroachment of business premises on the area previously occupied by working classes living in the immediate neighbourhood of their work. In 1861 the population was 129,031, but in 1901 it was only 101,463. In such circumstances the rule is reversed, and the demand for building land has gradually increased in proportion to the declining ratio of the population.

This anomaly has, perhaps, a more important bearing on the selling value of the land than on the question of its housing accommodation, but that feature will be more fully dealt with in the section devoted to valuations. In regard to its effect on population, it will be sufficient to bear in mind that such exceptional conditions can only prevail in districts where practically the whole of the available land has been covered with buildings.

II.—Average Area of Land Required.

The average area of land, per head, that is devoted to the accommodation of the annually increasing population varies somewhat considerably in different towns, and in different sections of many of the larger towns. This is especially the case in important manufacturing and commercial centres where the so-called 'East-End,' or poorer portions of the towns which are devoted to artisans' and workmen's dwellings, are densely populated; while in the 'West-End' sections that are occupied by the upper and middle classes, a comparatively large area of land is held with the several houses.

This disparity is, however, counterbalanced to a certain extent by the area of land required for the accommodation of working men during the day, in the shape of sites for factories, works, and warehouses, as well as for shops and other business premises. The area of open land devoted to parks and recreation grounds, largely for the benefit of the working classes, must also be taken into consideration.

Land withdrawn for Building.—It is worthy of note in this connection that the area of land transferred from rural to urban districts between 1891 and 1901 was 576,000 acres, while the quantity of land withdrawn from cultivation during that period was nearly 484,000 acres, which latter area increased between 1891 and 1907 to 624,000 acres. These figures indicate that the quantity of land withdrawn from cultivation between 1891 and 1907 was nearly 42,000 acres per annum. The population of England and Wales is increasing at the rate of nearly 400,000 a year, and the average annual area of land withdrawn from cultivation would thus be rather over 100 acres, per thousand, of increased population. The area referred to would, of course, include the land withdrawn from cultivation for building and commercial purposes, as well as for recreation grounds. It would also include the land that was either actually undergoing, or that was awaiting immediate development.

Area, per Head.—It is often remarked that whereas, on the one hand, the aggregate area of the land is strictly limited, on the other, the population is continually increasing. Assuming that the population was evenly distributed over the entire area of England and Wales, it will be seen from the following table how greatly the density of population increased during the past century :—

Date of census.	Persons per square mile.	Acres per person.	Proximity in yards.
1801	152	4·20	153
1851	307	2·08	108
1901	558	1·15	80

As an interesting contrast to the above general averages, the following examples of thickly populated districts, in different parts of the metropolis, may be cited, namely, the borough of Finsbury with about 165 persons per acre, Stepney with about 170, Shoreditch with about 180, and Southwark with about 177 persons respectively. In these boroughs it is, perhaps, scarcely necessary to add that there is very little, if any, land available for house-building, and no margin is, therefore, left for the accommodation of an increased population.

Open Spaces.—The area of land devoted to open spaces, such as parks, recreation grounds, and playing-fields has increased largely during recent years, and, in conjunction with the greater width of streets, forms an important element in connection with the healthy growth of towns. For the purposes of comparison, we find from recent publications relating to the more important boroughs that the average area of open spaces provided varies from an acre for about 1,000 persons in Leeds, to some 282 persons per acre in Ealing; while for the administrative county of London the average figures work out, approximately, at an acre for every 824 persons.

Number of Persons, per House.—In regard to the uninhabited houses, or those in course of construction, the census returns show that the number has generally increased in proportion to the population. It is doubtful, however, what proportion of the houses described as uninhabited are in fact dwelling-houses in the ordinary sense of the term. In 1901 the average number of persons to an *inhabited house* in England and Wales was 5·19, the proportion in the three preceding censuses having been 5·33, 5·38, and 5·32 respectively.

The census returns show that the average number of persons per house (including houses uninhabited or in course of erection) varies from 7·3 in London to 4·1 in Bradford. In this connection, however, it must not be forgotten that the term 'house' in the census returns signifies 'all the space within the external and party walls of a building,' and may therefore include a block of flats or improved industrial dwellings. As regards London, it is a fact that the substitution of blocks of dwellings for small houses made considerable progress during the last intercensal period, which undoubtedly tended to increase the number of persons to a house in 1901 as compared with 1891. It is obvious, however, from the figures for England and Wales, that, in spite of the defective nature of the returns above mentioned, the average number of persons declined from 4·94 in 1891 to 4·8 in 1901.

Densely Populated v. *Overcrowded Districts.*—In considering the general percentages before mentioned it is well to distinguish between districts that are 'densely populated' and those which are 'overcrowded.' For the purpose of the census returns, a dwelling was regarded as being overcrowded if the tenements contained more than two persons per room (bedrooms and sitting-rooms included), irrespective of the size of the apartments. While many of the workmen's model dwellings are densely populated, having regard to the number of persons, per acre, which they accommodate, they are not regarded as being overcrowded unless found to contain more than two persons per room.

A general statement of the number of persons, per acre, residing in a certain district is therefore apt to be misleading if no consideration be paid to the kind of houses which it comprises, or if no distinction be drawn between the sections occupied by working men and those devoted to the accommodation of the middle classes.

Municipal Model Dwellings.—In the following statement are given the areas of certain blocks of land that have been acquired by municipal bodies for the erection of workmen's model tenements and cottage dwellings, together with the average number of persons, per acre, to be accommodated in each case :—

Estate.	Area.	Total accommodation.	Number of persons per acre.	Remarks.
Metropolitan.	acres.	persons.		
Caledonian Estate, Holloway	2	1,384	692	Tenements
Westminster	1⅘	1,600	888	Six-storey tenements
Brixton Hill, S.W.	1	718	718	Five-storey tenements
Provincial.				
Hornby Street, Liverpool	5¾	2,146	425	Three-storey tenements
Metropolitan.				
Totterdown Fields	38¾	8,532	220	Cottages
Norbury	31	5,800	186	Cottages
Wood Green	225½	12,500	188	Cottages
Old Oak Common Lane	54	10,680	197	1,250 Cottages of four different classes

The foregoing statement shows that the number of persons proposed to be accommodated, per acre, varies from 186 to 220 in the cottage dwellings, and from 425 to 888 in the blocks of tenements of three storeys and upwards. In these calculations no allowance has been made for vacancies, but if a full deduction were made the properties would still afford examples of densely populated areas, although they would not be overcrowded, in the technical sense of the term. In fact, the number of persons that are thus proposed to be accommodated in two-storey buildings on an acre of land is by no means in excess of what is allowed under the Model Bye-laws. This will be obvious from an inspection of Plan shown as Fig. 1, which provides for 52 houses being erected on 43,560 square feet, or an acre of land. If five persons be calculated for each house there would be 260 persons to the acre; but if the average number of persons be reduced to four per house, there would still be accommodation for 208 persons.

Copartnership Estates.—Under other methods of development that are being adopted in different parts

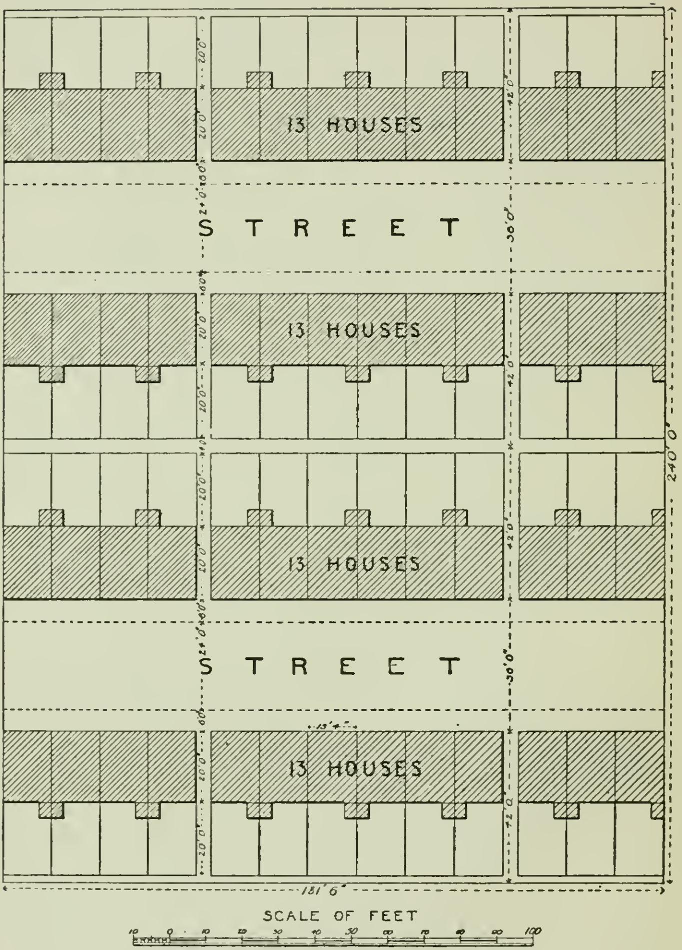
13 HOUSES
STREET
13 HOUSES
13 HOUSES
STREET
13 HOUSES
20'0"
24'0"
10'0"
42'0"
30'0"
13'4"
240'0"
181'6"
SCALE OF FEET
10
0
10
20
30
40
50
60
70
80
90
100

Fig. 1.

of the kingdom by a federation of copartnership house societies, known as the Copartnership Tenants, Limited, for the benefit of the artisan and wage-earning classes, the average number of persons, per acre, is materially reduced, as approximately shown in the following tabulated statement :—

Name of Society.	Area of estate.	No. of houses to be erected.	No. of persons to be accommodated.	Av'rage number of persons per acre.
	Acres.			
Ealing Tenants	38	500	2,500	65
Garden City Tenants	34	300	1,500	44
Sevenoaks Tenants	5½	60	300	55
Hampstead Tenants	40	480	2,400	60
Fallings Park Tenants, Wolverhampton	20	240	1,200	60
Manchester Tenants	11	130	650	59
Harborne Tenants, Birmingham	53	530	2,650	50

First-class Villas, &c.—Where the land is developed for first-class villas or family residences, as indicated on Plan Fig. 2 (see p. 61) the average would probably be about four houses, or 20–24 persons to the acre, after allowing a fair proportion for roads, open spaces, churches, schools, and other public and semi-public buildings, as shown in the following general apportionment :—

		sq. ft.
4 sites, each 200′ × 40′	=	32,000
One-half of front road, 160′ frontage × $\frac{50'}{2}$	=	4,000
Proportion of cross-roads, assuming a 40-feet cross road to every 600		

		sq. ft.
lineal feet of main road. $= \frac{160}{600}$ or $\frac{4}{15}$ of 40′ × 200′	=	2,132
Proportion of land required for Churches,[1] Schools,[2] &c., from $\frac{1}{20}$th to $\frac{1}{25}$th part (say)	=	2,000
Proportion of land for parks and open spaces, from $\frac{1}{10}$th to $\frac{1}{15}$th part (say)	=	3,428
Total square feet, per acre ..		43,560

Second-class Villas and Terraced Houses.—For second-class villas, semi-detached, or in small blocks, or for two-storey terraced houses, the number that can be accommodated, per acre, varies from 50 to 80 persons, after making such proportionate allowances for roads, open spaces, &c., as have been previously indicated.

Workmen's Dwellings and Cottages.—These must necessarily be built in a district that offers cheap travelling facilities, while the limit of cost must be such as to permit of the houses being let at low rents. For the artisan or skilled workman who can afford to pay for four, five, or six rooms, a small semi-detached or terraced house can be provided without entailing any financial loss; but for those who can only afford to pay for two or three rooms, a more economical and restricted method of precedure must be adopted.

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[1] The 1901 census showed that there were 39,895 clergymen and ministers of religion in England and Wales, and taking the population at 32,527,843 gives an average of 815 persons to each clergyman or minister.

[2] This percentage is computed on the basis that about two acres of land will be required for every thousand persons of the middle class, and which might be apportioned as follows:—church, ½ acre; schools, ½ acre; cemeteries, ¼ acre; proportion of railways, water works, gas works, municipal and other semi-public buildings, ¾ acre.

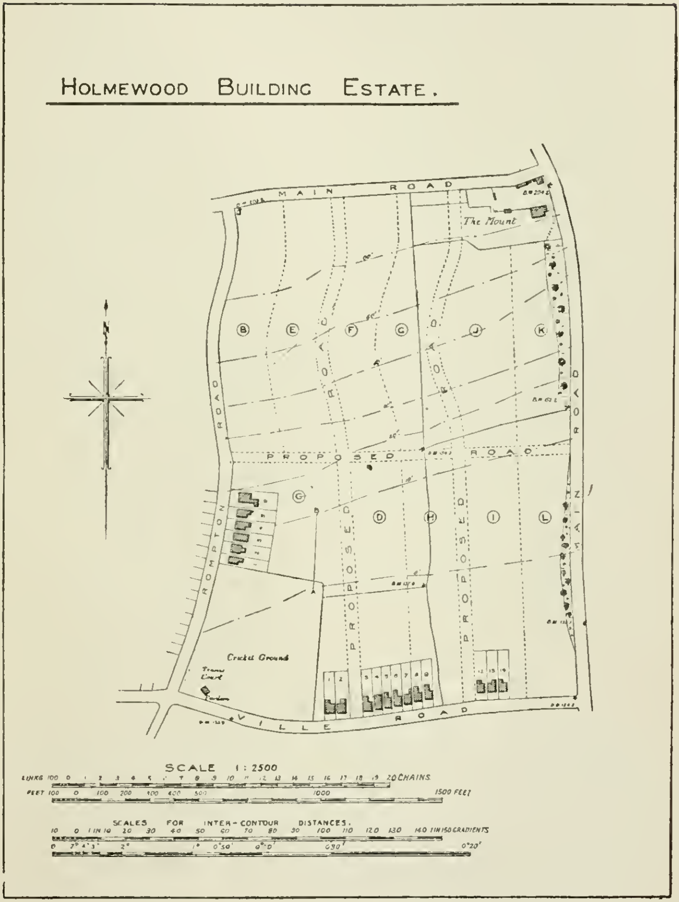
HOLMEWOOD BUILDING ESTATE.
MAIN ROAD
The Mount
B
E
F
C
J
K
PROPOSED ROAD
G
D
H
I
L
Cricket Ground
Tennis Court
Garden
VILLE ROAD
SCALE 1 : 2500
LINKS 100 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 CHAINS
FEET 100 0 100 200 300 400 500 1000 1500 FEET
SCALES FOR INTER-CONTOUR DISTANCES.
10 0 1 IN 10 20 30 40 50 60 70 80 90 100 110 120 130 140 1 IN 150 GRADIENTS
0 7° 4° 3° 2° 1° 0°50' 0°40' 0°30' 0°20'

Fig. 2.

The requirements in the latter case may be partially met by small-class blocks or tenement dwellings, but the conditions must necessarily lead to a reduction in the amount of space devoted to such buildings, and thus tend to overcrowding. Under these circumstances, there is often a wide difference in the number of persons accommodated in the various sections of workmen's dwellings, varying, it may be, from 60 to upwards of 200 persons, per acre.

The rule which housing reformers have endeavoured to follow is to build not more than twelve houses per acre. Unless, however, special arrangements can be made in regard to the bye-laws as to road construction, and the land can be acquired for a sum not exceeding £300 per acre (tithe and land tax redeemed), such houses cannot be provided to let at rents of less than 6*s*. per week, except by philanthropists. This may be proved from the following figures :—

	£
Cost of land, $\frac{1}{12}$th of £300 per acre .. =	25
Cost of road making and sewers at $\frac{1}{12}$th of £300 per acre .. .. =	25
Cost of cottage .. .. =	150
Minimum expenditure ..	£200

Six per cent. on £200 is equal to £12 per annum, to which must be added about one-third of the net rent, or £4, to cover the average cost of repairs, insurance, &c., thus making a total rent of £16 per annum, which is equal to a weekly rent of 6*s*. 2*d*., the tenant also paying rates and taxes.

In the case of Port Sunlight, where the land cost £240 per acre, it has been found that the total cost of each house has been as follows :—

		£
Cost of land, $\frac{1}{10}$th of £240	=	24
Cost of cottage, roads, &c.	=	330
	Total cost ..	£354

This aggregate sum, taken at the very moderate rate of 4½ per cent. to cover interest and depreciation, represents a net weekly rent of about 6*s.* 2*d.*, and with repairs and other incidental expenses will amount to not less than 8*s.* per week. The actual rent paid is 5*s.*, and the balance is made up by the application of part of the profits of the business that is set aside for that purpose.

Comparative Statement of Housing Accommodation.—From the foregoing data it will be seen that the average number of persons that can be accommodated on a given area of land varies according to the method of building development adopted, and other special circumstances, the several percentages being summarised as follows :—

Densely populated boroughs	from 150 to 180 persons, per acre[1]
Sections devoted to workmen's dwellings built in blocks, and let in tenements	,, 425–888 ,, ,, ,,
Sections devoted to cottage tenement dwellings ..	from 170 to 217 persons, per acre[1]
Do. under Model Bye-laws	,, 208–260 ,, ,, ,, [1]
Improved copartnership houses	,, 44–65 ,, ,, ,, [1]
Second-class villas and terraced houses ..	,, 50–80 ,, ,, ,, [1]
First-class detached villa residences	,, 20–30 ,, ,, ,, [1]

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[1] Including area required for roads, &c.

CHAPTER III

DEVELOPMENT SCHEMES

Reasons for General Scheme.—The need of a carefully thought-out plan for a new house is generally realised before the work of erection is put in hand, in order that proper provision may be made to meet the requirements of the intending occupier. The internal accommodation necessary in the form of reception rooms, sleeping apartments, and domestic offices may then be prearranged, and the position of the house in regard to its surroundings, sanitation, water supply, and residential amenities fully considered. The success of the undertaking may, nevertheless, depend in no small measure on the means of approach, or on some other extraneous or seemingly unimportant matter that is essential to the completion of the scheme, but which, in a hastily prepared or incomplete plan, has been overlooked.

The same remarks are, at least in principle, applicable to the development of a building estate. A comprehensive general scheme which is so essential in one case is just as necessary in the other, and the ultimate success of the undertaking may as readily be marred through lack of oversight in not providing for the necessary means of access, or of drainage, or in disposing of adjoining land to be utilised in a way that proves to be detrimental to the general development. Indeed, cases are frequently met with where land which formed, as it were, ‘the key of the situation’ for building purposes has been sold away at, perhaps, a seemingly high price, but the loss of which has afterwards seriously hampered, if it has not entirely stopped, the development of the adjoining property.

Detailed plans are, of course, prepared for separate and comparatively small blocks of property which, with the growth of the adjacent towns, become eligible for building, but the need of a comprehensive scheme, in which provision is made for the prospective requirements of the more distant land comprised in an estate is, judging from our own experience, seldom fully realised. The reasons for this seeming omission are not far to seek. The limited area of the blocks dealt with from time to time, and the somewhat lengthy period that must in many cases elapse before the main portion of the estate will become ripe for building, both tend to beget a feeling of indifference, and to make the prospective advantages which such a general scheme might offer appear so remote as to be of no present value or importance. Moreover, the formulation of a comprehensive scheme, such as that which we have indicated, would, if well done, entail a rather considerable expenditure of time and thought, and, being somewhat outside the ordinary duties of a private agent, the assistance of an expert surveyor would necessarily have to be obtained, and which would involve the payment of a proportionate fee.

The question as to whether the interests at stake are such as to justify the expenditure must rest with the present or prospective owner to decide, but given an estate of varying character, and of sufficient magnitude, and which from its position is gradually acquiring an appreciable element of building value, the need of a well-considered prospective scheme seems to speak for itself.

Advantages of Prospective Scheme.—The advantages appertaining to the preparation of general schemes of building development have been more fully realised in Germany, where, owing to the great increase of population since 1870, and the rapid development of commercial and manufacturing systems, there has been a remarkable extension of the more important towns. The evils of overcrowding of houses have, in consequence, become so much more pronounced than in this country that they have naturally attracted more attention there than here. Taking ten of the principal towns of Germany, we find, from tables computed by Dr. Eugen Jaeger, that on an average each house was occupied by 29 persons in 1890; while in ten of the principal towns of this country the average number of persons in each house, in 1891, was 6·1. This wide difference is partly accounted for by the fact that in Germany the great majority of the working classes, in towns, now occupy dwellings of which each house contains several, although at one time one-family houses were most common, whereas in England most workmen's dwellings are occupied by one family only.

German Methods.—Realising the mistakes which they have made in the past in regard to their streets, more especially in the unnecessary width—from 55 to 84 feet—of their secondary or subsidiary roads, their systems of sewerage, the erection of tall barracklike dwellings, and the non-division in districts of good-class houses, workmen's dwellings, and factory sites, the municipal authorities in Germany are doing their utmost to rectify matters and prevent their recurrence. With this end in view it has been arranged that, in regard to the land surrounding the more important towns, which will probably be needed for development over a period of at least ten years, there shall be very carefully thought-out plans prepared by the local town council. These plans are to provide that, while the streets to be used exclusively for dwellings shall not be so wide as to make houses too costly, there shall be wide tree-planted spaces near all the narrower thoroughfares, so that the inhabitants may have a recreation ground within easy reach. The best plans provide that towns shall be divided into building districts, and that, in proportion to its distance from the centre, each district shall have less of its area covered by buildings, and shall have lower buildings. In the outlying districts buildings of two storeys only are generally allowed; but in the centre of the town four or five storeyed buildings may be erected.[1]

It is recognised that, in the preparation of building plans for towns, great attention must be given to so arranging the direction of streets that all dwellings may receive as much sunshine as possible. It is also thought desirable to arrange for certain districts to be devoted to the sites of workmen's dwellings, as well as factories and other works. Great efforts are being made to promote the erection of small houses for working people, in order that each family may have its own house.

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[1] *The Example of Germany.* Horsfall.

Town Planning in Saxony.—In Saxony provisions such as those above indicated were embodied in an Act of Parliament passed in 1900, and made compulsory throughout the kingdom. These provisions are highly suggestive, and a synopsis of the more important rules relating to the preparation of building plans, and the acquisition of land for public improvements may not, therefore, be deemed out of place here :

Sec. 15. Provides that if a district, which, practically, is still unbuilt on, is to be laid open for building, a building plan must, as a rule, be prepared for it by the Local Authority. A building plan can also be prepared for a district already built on.

Sec. 16. By building plans, the following matters, especially, are regulated : (*a*) the building-lines within which the sites may be built on, and by which the areas intended for traffic or for front gardens, as well as those which form part of the high-flood district, are to be divided ; (*b*) the mode of building, the distance of buildings from the street-lines and from the boundaries of adjoining sites, the height of building, the permissibleness of trade buildings, as well as the extent to which buildings may be erected behind the main buildings ; (*c*) the rectification of water-courses, the draining of the district, as well as the nature of the street-crossings (above or below).

Sec. 17. Building plans must comprise the necessary plans, and the regulations which have to be published respecting building in the district. The nearer definition of the material needed for a building plan is reserved for an executive decree, or for local bye-laws.

Sec. 18. In the preparation of building plans attention must be paid to the claims of security from fire, to the public traffic which is to be expected, and to health requirements ; to a suitable supply of water, and to drainage ; to the position and development of the place, and to the need for dwellings corresponding to the local conditions ; and also to ensuring that streets and squares shall not be disfigured. In this relation special attention must be paid to the following points :—(*a*) The position of the blocks of building, as well as of the lines of streets and the building-lines, must be adapted to the configuration of the land, and must be such that an adequate supply of sunshine in the rooms occupied is secured ; (*b*) the dimensions of the various blocks of building must be such as to allow of the proper utilisation of the ground for building ; (*c*) the width of streets and footpaths is decided by the requirements of local traffic, and must be suitably graduated in accordance with the nature of the streets as main streets, by-streets, or streets only used for dwellings. In the case of streets of detached or semi-detached buildings, where there is no proper through traffic, the part of the road used for vehicles need not exceed a width of 8¾ yards. In the case of streets for which through traffic may be expected eventually, especially tram-lines, and a widening of the street must be anticipated, there must be front gardens of suitable depth on both sides. Private roads, which give access to the backs of buildings for several blocks, must not have a less width than 6½ yards. Streets with open building and a moderate amount of through traffic, and all streets with continuous buildings, must have a width of at least 13 yards, and streets which have much business traffic or through traffic must be made at least 18½ yards wide ; (*d*) gradients in the streets must be distributed as evenly as possible; heavy gradients, deep cuttings and embankments, as well as inordinately long straight lines of streets, must be avoided as much as possible; (*e*) in determining the directions of streets care must be taken to provide short and convenient connections between streets and with the chief centres of traffic; (*f*) open spaces and public shrubberies must be so arranged in respect of size, position, and number, as to be useful in relation both to convenience of traffic and to general welfare. Sites for churches and school buildings, as well as public playgrounds and recreation grounds, must be provided in sufficient number; (*g*) in deciding what shall be the kind of building allowed, and as to whether factories and workshops shall be allowed, the existing character of the district, or part of a district, and its needs must be taken into account. In any case, care must be taken that continuous lines of building, so far as they are not excluded by the local building regulations, shall be interrupted in sufficient measure by streets of open building, and that in the outer districts a suitable restriction of the density of building and population occurs; (*h*) front gardens, when they are not provided in view of a future widening of the street, must have a depth of at least five yards; (*i*) the number of storeys to be allowed must be decided according to the character of the place and the width of the street. For country places and districts of detached houses there must not be more than three storeys, and elsewhere not more than four; and only in the central districts of large towns, in unusually wide streets or squares, or along the banks of streams, which have been rectified at great cost by the riparian owners, may five storeys be allowed by way of exception. The ground storey, any intermediate storeys, and the roof storey, if it is used for dwelling purposes, are included in the number of storeys allowed; (*k*) the necessary courts and gardens in the interior of a block of buildings must be secured by regulations respecting their area and position, and, if necessary, by fixing back-building lines; (*l*) so far as any building at all is permissible on land behind buildings, it must be made to depend on the size of the court or garden, and, as a rule, be allowed for dwelling purposes only if a supply of light at an angle of at least 45 degrees is not secured for all the windows of the back-building, and the space between the front and back-buildings is, in suitable cases, planted as a garden. Exceptions are allowed under special conditions in the central districts of large towns.

Sec. 36. After the building plan has been adopted, plots of land in the district may not be divided except by permission of the Building-Police Authority. Permission can be refused, if the division affects a building, if the necessary fire-proof walls have not been built along the new boundary, or if, by the division, any of the regulations respecting the size of courts and gardens would be infringed, or the carrying out of a building plan or of a redistribution plan would be made impossible or difficult, or, lastly, if unusable pieces of land would remain.

Sec. 59. Plots of land which are too small to serve as sites for buildings must, if the parties interested do not make a voluntary arrangement for disposing of them, be sold to the community, for distribution among the owners of the other plots, and from whom the purchase money will be recovered.

Sec. 67. If land has to be acquired for (*a*) widening, straightening or continuing streets, roads or squares for traffic, (*b*) making or completing the same, (*c*) constructing and widening bridges, (*d*) repairing river banks and embankments, (*e*) constructing sewers and laying down water pipes, carrying water pipes and sewers into separate building plots, as well as for connecting sewers with those of neighbouring towns or districts, (*f*) completing or amalgamating plots of land lying amongst rows of houses, or has to be subjected to some easement or analogous burden, the necessary land can be expropriated, or be subjected to burdens, in return for compensation, so far as this seems desirable in the public interest, on the application of the Town Council through the Building-Police Authority, and subject to the approval of the Ministry of the Interior.[1]

American Opinion.—The result of this awakening in Germany, as seen from an American point of view, is given in Shaw's recently published work on 'Municipal Government in Continental Europe.'[2] He states that 'Nothing is hurried, yet nothing seems to lag when once begun. Street systems are rectified; new suburbs are judiciously laid out; here a new water supply, introduced from high sources, employs engineers, architects, and conduit builders. In another city new sewers are in progress, on a plan for the complete and final drainage of the place. River frontages are undergoing magnificent improvement, for purposes of water traffic. Gas-works, electric plants, market houses. public abattoirs, school buildings, epidemic hospitals, bridges, wharves, subways, or whatever else the expanding requirements of the municipality may ordain,—all are in course of construction by methods that ensure the highest utility and greatest permanence. To cite illustrations, or to present statistics would introduce an almost endless task. It is enough to say that the German cities have accepted the idea that their appointments must conform to the newly recognised necessities of modern life, and that they are steadily supplying these appointments with masterly administrative and technical ability, and with such a combination of close economy and generous foresight as no other nation has ever exhibited ' (p. 333).

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[1] Readers wishing for further information regarding the system of building development that is being pursued in Germany may be referred to Horsfall's interesting treatise on *The Example of Germany in the Improvement of the Dwellings and Surroundings of the People.*

[2] T. Fisher Unwin.

After such a glowing eulogium, one cannot wonder at the temerity of an Oberbuergermeister in criticising our municipal management, despite the serious overcrowding that still exists in Germany. In an address delivered in Dresden, this gentleman is reported to have said that ' The enforcement of building plans, and the restriction by building regulations of the use of building land are recognised on all sides as necessary, and a large part of the evils existing in English towns is due to there not having hitherto been building-police regulations, in the German sense of the words, in existence there.'

English Methods.—The main principles underlying the German ideals of town development are similar to those that have been adopted in the management of the more important estates in this country ; but in their practical application more attention has been paid to the interests of the land-owners. There the facilities of a partial state-ownership of the land have been realised; but here the improvements have been effected by the intelligent co-operation of owners with the local authorities. All the best illustrations which can be shown in this country of really good all-round development are the outcome of, what has been termed, 'despotic benevolence,' or, in other words, they have come from the public-spirited efforts of some individual land-owner, or body of land-owners.

We may have nothing to compare with Dusseldorf, or the projected development of Frankfort-on-Main, in its entirety, yet it is open to doubt whether, from a financial point of view, and having regard to the comparatively restricted and partial modes of procedure that have had to be adopted in this country, any better results have been attained in Germany than are represented by some of the Metropolitan suburbs where comprehensive schemes of development have been followed. However that may be, the advisability of formulating a proper scheme for the future development of each town, having regard to its special prospective requirements, is emphasised by the efforts which the Germans now find it necessary to make to rectify their mistakes in the past.

HOUSING AND TOWN PLANNING ACT, 1909.

Leading Characteristics.—A great deal has been made of the example of Germany in the movement for improving workmen's dwellings, and which has, undoubtedly, had some effect on the trend of recent legislation. The Housing and Town Planning Act of 1909 provides for town planning schemes on somewhat similar lines to those contemplated in the Saxony law before referred to. This recent Act, however, is more particularly intended to afford increased facilities for the acquisition of land for housing the working classes only, by enabling the authorities in every urban or rural district throughout the country to put in force Part III. of the Housing of the Working Classes Act, 1890, which previously was only permissive. For this purpose provision is made for loans to be obtained from the Public Works Loans Commissioners, for a period that has been extended from fifty to eighty years, at the minimum rate of interest possible; for the construction of streets in connection with the acquisition of such land, and generally for amending the procedure for closing and demolishing houses unfit for habitation; the preparation of improvement and reconstruction schemes, and various other matters connected with the housing of the working classes.

Provisions for Town Planning.—The part of the Act relating to town planning is of a permissive nature; while its general provisions are manifestly intended to promote co-operative, rather than independent, action between local authorities and land-owners. This part of the Act also aims at removing such difficulties in the shape of conflicting statutory enactments, bye-laws or regulations as prevent local authorities in connection, or near association, with one another from acting jointly in a comprehensive scheme for the development of their districts in the best interests of the community.

In explaining what the Government contemplated in a town planning scheme, the President of the Local Government Board stated that, ‘Whereas in the past, without any scheme, roads had been badly laid, of insufficient width, and without any relationship to other roads, the Government by this Bill gave the responsible local authority power to initiate a town planning scheme, so that private owners would improve their own properties instead of acting to their individual or collective detriment.'[1]

For this purpose the enactment provides that a town planning scheme may be made by any local, or other responsible authority (not County Councils) in respect of any land which is in course of development, or which appears likely to be used for building purposes, with the general object of securing proper sanitary conditions, amenity, and convenience in connection with the laying out and use of the land, and of any neighbouring lands. Before, however, any of the local authorities are justified in preparing such a town planning scheme with reference to 'any land within or in the neighbourhood of their area,' they must first satisfy the Local Government Board that there is a *primâ facie* case for making such a scheme; or any local authority may be authorised to adopt, with or without modifications, any such scheme proposed by all or any of the owners of the land comprised therein.

The scheme may include any land likely to be used as, or for the purpose of providing open spaces, roads, streets, parks, pleasure or recreation grounds, or for the purpose of executing any work incidental to the scheme. It may also include a piece of land already built upon, or that is not likely to be used for building purposes, if it appear to the Local Government Board that such land should be included in the scheme, and provision may thereupon be made for demolishing or altering any building thereon so far as may be necessary for carrying the scheme into effect. The question as to what land may, or may not, be included in the scheme rests, in the first instance, on the decision of the Local Government Board, but if an objection be presented to the Board, a public inquiry must be held in the locality before the matter can be definitely settled.

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[1] *The Times*, September 1, 1909.

The proposed scheme may be varied, or a subsequent scheme may be substituted if the Local Government Board should think fit, or the scheme may be revoked entirely, if, upon the application of the authority responsible for the execution of the scheme, or of any other interested person, the Board think that under the special circumstances the scheme should be so revoked. In any case the scheme does not become operative until it has been formally approved by the Board; while if objected to, the scheme does not become valid until it has been confirmed by Parliament.

In cases where the scheme contains provisions for suspending any statutory enactments, bye-laws or regulations, in order (it may be) to relieve the promoters of unnecessary expenditure on road construction or other works, such scheme does not come into force until a draft has been submitted by the Board for the approval of Parliament.

Where the land proposed to be acquired is situated in London, or in a borough or urban district, the Board must appoint an impartial person, not in the employment of any Government Department, to hold a public inquiry and report as to whether the land proposed to be acquired is suitable for the purpose, and whether it can be taken without undue detriment to the persons interested therein, or the owners of adjoining land. If, after receiving the report, the Board confirm the order otherwise than subject to the recommendations contained in the report, their order is rendered of a provisional nature only, and does not have effect unless confirmed by Parliament.

Mode of Procedure.—The Local Government Board may make regulations as to the mode of procedure to be adopted with respect to applications for authority to prepare or adopt a town planning scheme, the preparation of the scheme, obtaining the approval of the Board to a scheme so prepared or adopted, and any inquiries, reports, notices or other matters required in connection with the preparation of, adoption, or, as to the approval and execution of the scheme, or enforcing the provisions thereto. In such regulations provision is to be made for securing co-operation on the part of the local authority with the owners and other persons interested in the land proposed to be included in the scheme, at every stage of the proceedings, by means of conferences and such other means as may be provided by the regulations, and also for dealing with other matters as are set out in the fifth schedule to the Act, given below :—

1. Procedure anterior to and for the purpose of an application for authority to prepare or adopt a scheme :—

(*a*) Submission of plans and estimates.

(*b*) Publication of notices.

2. Procedure during, on, and after the preparation or adoption and before the approval of the scheme :—

(*a*) Submission to the Local Government Board of the proposed scheme, with plans and estimates.

(*b*) Notice of submission of proposed scheme to the Local Government Board.

(*c*) Hearing of objections and representations by persons affected, including persons representing architectural or archæological societies or otherwise interested in the amenity of the proposed scheme.

(*d*) Publication of notice of intention to approve scheme and the lodging of objections thereto.

3. Procedure after the approval of the scheme:—

(*a*) Notice to be given of approval of scheme.

(*b*) Inquiries and reports as to the beginning and the progress and completion of works, and other action under the scheme.

4. Duty, at any stage, of the local authority to publish or deposit for inspection any scheme or proposed scheme, and the plans relating thereto, and to give information to persons affected with reference to any such scheme or proposed scheme.

5. The details to be specified in plans, including, wherever the circumstances so require, the restrictions on the number of buildings which may be erected on each acre, and the height and character of those buildings.

Assessment of Compensation.—In section 60 the authority responsible for the execution of a town planning scheme may, *for any purpose*, purchase any land comprised in the scheme by agreement, or be authorised to purchase such land compulsorily, in the same manner as a local authority may purchase land situate in an urban district for the purposes of Part III. of the Housing of the Working Classes Act, 1890, as amended by section 2 of the present Act. Under the amendment referred to the basis of compensation payable is altered. The 1890 Act provided that 'the estimate of the value of such lands or interests shall be based upon the fair market value, as estimated at the time of the valuation being made of such lands, and of the several interests of such lands,' whereas under the present Act, as well as under the Small Holdings Act, 1907, the basis of value is left an entirely open matter, and no additional allowance is to be made on account of the purchase being compulsory.

In all cases of disputed compensation the amount is to be fixed by a single arbitrator to be appointed by the Local Government Board, and the provisions of the Lands Clauses Acts are to be applicable to such arbitrations, subject nevertheless to the provisions contained in the first schedule to this Act. This schedule provides that parties may appear either by themselves or by their agents, but neither counsel nor expert witnesses are to be heard, except by special direction of the Local Government Board.

Any person whose property is injuriously affected by the operation of a town planning scheme is to be compensated, but where at the same time the scheme increases the value of other property, the owner is liable to pay to the authority one-half the amount of such increased value. Any question as to whether the property is either injuriously affected or increased in value, and as to the amount to be paid as compensation, either to the land-owner, or from the land-owner to the authority responsible for the execution of the scheme, is to be determined by a single arbitrator to be appointed by the Local Government Board, unless the parties agree on some other method of determination. Provisions may be inserted in a town planning scheme for prescribing the height and character of, as well as the space about buildings to be erected, and for limiting the number of such buildings; but property shall not be deemed to be injuriously affected if the amenity of the area can be reasonably secured by such means.

The provisions above referred to, relating to compulsory purchase, appear, at first sight, to clash with the rights of ownership as generally understood in this country; while in regard to Germany it may be pointed out that compulsory expropriation is seldom allowed for the purpose of town extension. It seems, therefore, a one-sided arrangement to compel an owner, in the first place, to sell his land without making him some reasonable allowance beyond its ordinary selling value to an outsider, and, secondly, to accept a price that is to be fixed by an arbitrator to be appointed by the Local Government Board, who must necessarily be a party to the affair. Although such a mode of procedure may form the most economical and expeditious course for dealing with matters of the kind, its arbitrary character is scarcely likely, at first, to be appreciated by owners, or to promote that spirit of co-operation between them and the local authorities which is essential to the successful working of the Act. The fact that anyone having an interest in the land may object to a scheme, and thus compel the promoters to obtain Parliamentary sanction, will, probably, tend to reduce the number of disputed cases of compensation, on account of the expense and length of time which an application to Parliament would entail. It appears, however, that, with a view of facilitating such settlements, the Government were alive to the necessity of the measure being accompanied by legislation for a proper method of valuation, and which they have endeavoured to supply in the valuation clauses of the Finance Act, 1909.

Apart from its compulsory acquisition clauses, the Housing and Town Planning Act appears to favour the principles of development already adopted on many large estates, while it also tends to afford such properties a certain amount of protection. In cases where a comprehensive scheme of development cannot be carried out in such a manner as would be of the greatest advantage to the community, on account of divided ownerships, the Act suggests and provides for joint action between the several landowners. In this way the measure is not unlikely to have a somewhat adverse effect on the pecuniary interests of those who may be developing their properties in a manner that is not conducive to the general welfare, or on the owners of small blocks of land, the development of which is being withheld to the detriment of the community.

Where, however, a comprehensive and well thought-out scheme of development, on broad principles, has been already prepared, in which the sanitary conditions, amenities, and conveniences in connection with the laying out and use of the land, in the best interests of the public, as well as of the owner, have been properly secured, there will be no reason for the local authorities to move in the matter.

Under such a general scheme as that referred to the sections of an estate that were most suitable for good class family residences would be devoted entirely to the erection of such houses; while those portions that, from their situation or otherwise, were best adapted for business premises or small class dwellings, would be developed on those lines. In this way the best possible use would be made of the land, and a uniformity of development attained that would prove a material factor in establishing and maintaining the character of the several sections *en bloc*, as well as of the capital value of their component parts.

Elasticity of Scheme.—The extent to which the mode of development can be advantageously predetermined is a matter for which no hard-and-fast rule can be laid down. Each case must necessarily be considered on its own merits, and care taken that the scheme is sufficiently elastic to be capable of adaptation to circumstances other than those existing at the time of inspection, otherwise it may well prove to be a hindrance rather than a help, and thus defeat its own object. It may be sufficient, in some cases, to define the lines of the principal roads that would be required to form the most effective connections with existing main thoroughfares, having regard to the interests of the locality, as well as of the estate under consideration, and leave the subsidiary roads to be adapted to meet the special requirements of any subsequent changes that may take place prior to development. The lines of the main sewers might also be determined so far as practicable to ensure the drainage of the several sections.

Determination of Road-lines.—In prearranging the principal roads the fact should be borne in mind that the requirements of the local authorities, in regard to the width of new streets, may be altered from time to time. Moreover, the possibility of tram-lines being laid along the roads should be considered and the necessary provision made. In some districts the Local Authorities hold a discretionary power to vary the width of new streets. In Barrow-in-Furness, for instance, the main thoroughfares may have to be as wide as 80 feet, and in Sunderland 60 feet. In no case, therefore, should they be less than 50 feet in width, if such roads are likely to be used for tram-lines.

The roads would be ultimately arranged to meet the requirements of the several sections of the estate, somewhat on the following lines. For the blocks devoted to the erection of good detached or semi-detached residences, the roads might be from 300 feet to 500 feet apart, thus allowing a depth of 150–250 feet for the double row of houses, which would have side entrances approached from the front; for those intended for shops and business premises, from 75 feet to 200 feet on each side of a main road, this depth being sufficient to permit of a secondary road, or covered way being formed at the back of the premises. For the sections intended for workmen's dwellings, the roads might be from 150 feet to 250 feet apart, thus affording a depth of 70–115 feet for each house, in addition to a drainage road at the rear. For factory purposes or works, the blocks would vary in size from one to eight or ten acres, and the roads would be planned in accordance therewith.

Effect of Scheme.—The scheme thus outlined would show what sections of the estate could be developed independently, and would at the same time indicate what provisions would be required in the shape of easements for drainage, means of approach, and other matters necessary for the development of the other portions. With this information before him, the owner would be in a position to deal with any applications that might be forthcoming for his land, as he would be able to judge of the probable effect which the disposal of any portion of his property would be likely to have on the remainder, and, if necessary, to frame such restrictions as would prevent the latter being depreciated by his acceptance of an advantageous offer. (For Forms of Restrictions see pp. 312 and 316.)

Disposal of Building Land.—The methods which an owner may adopt in the disposal of his property are rather numerous, and vary according to the purpose for which building sites are required, and to the custom of particular localities. As a rule, however, an owner forms the new roads, and lays whatever sewers are necessary for the development of his land, although in some instances the would-be purchaser or lessee is willing to undertake this work, the probable expenditure being considered in the amount of purchase money, or ground rent. For our present purposes, the different methods of disposing of building properties may be considered under the two following headings :—

1. The leasehold system in which the owner does not part with the whole of his interest, but creates a tenure for a term of years, in consideration of the payment of a capital sum, or annual ground rent, at the end of which term the land and houses upon it revert to his heirs.
2. The freehold purchase or rent-charge system, where the owner parts with the whole of

his interest for a lump sum, a sum to be paid in instalments, or a rent-charge, but in neither case is the reversion of the property to him at any future time of any appreciable value.

(1) *The Leasehold System.*—This might take the form (*a*) Of a letting of a block of land, under a building agreement, whereby the builder undertakes to cover the land with houses, the minimum nett cost of which is fixed, within a certain number of years, and to pay a certain annual ground rent after the expiration of an agreed period—usually one or two years—sufficient to permit of some of the houses being built. As soon as any of the houses are completed the builder is usually entitled, under his agreement, to a separate lease for each house, and which also provides for the payment of a proportionate part of the aggregate ground rent, or what is known as a 'freehold ground rent,' in respect of such house;

(*b*) Of a lease granted to a speculating financier subject to conditions similar to those already described, the lessee then advancing money to builders during the erection of the houses, and repaying himself by granting sub-leases at largely increased rents, which are generally known as 'improved leasehold ground rents';

(*c*) Of a lease granted direct to manufacturers subject to conditions similar to those already described, but qualified by special restrictions as to the use which the lessees shall make of the site;

(*d*) Of a lease granted subject to the payment of a capital sum or premium by the lessee at the commencement of the term, and a peppercorn rent afterwards:

(*e*) Of a lease granted subject to the payment of a ground rent annually, the lessee having the power to renew upon payment of a certain fine.

The length of the lease-term varies, but in London, Birmingham, and several other towns it is usually 99 years; while in Lancashire the period is generally fixed at 999 years. In the former case the value of the reversion only becomes appreciable after the expiration of the first thirty years.

In the development of large estates it is customary to provide that the aggregate amount of ground rent, payable in respect of each block of land agreed to be let, shall be fairly apportioned over the several plots into which it is to be sub-divided, in order that the ground rent payable on each house shall be properly secured. On smaller properties, however, the division of the aggregate amount payable is sometimes left to the speculative lessee's discretion, especially where he undertakes the formation of the roads and sewers.

Improvement of Ground Rents.—For the purposes of illustration, it may be assumed that A, the landowner, agrees to grant 99 years' leases to B, a speculative lessee, of ten acres of land at £20 per acre, or £200 in all; and that ten houses per acre, or a total of one hundred houses, are to be build on the property. After the roads have been formed, the lessee may deal with the property in many different ways, of which the following are the more important:—

I. B may sub-let to builders C, D, E, and F, in small portions, and for the residue of the term of 99 years (less one day), at rents amounting to £50 per acre, or a total rental of £500. If the aggregate ground rent of £200 is evenly distributed over the houses, B will be entitled to take up 100 separate leases at a *freehold* ground rent of £2 per house, and on the same basis he would grant to C, D, E, and F 100 separate leases of the same houses at an *improved leasehold* ground rent of £5 for each house.

II. B may sell to the land-owner A, for a capital sum of about twenty years' purchase of the difference between the original and the improved ground rents, i.e. between £2 and £5, the right to let plots direct to C, D, E, and F, at the rent of £5 each which these builders had agreed to pay, instead of letting the plots to him, B, at the rent of £2. In such case the £5 *improved leasehold* ground rents may be converted into *improved freehold* ground rents, as they could be sold by A to carry the reversion to the freehold at the expiration of the leases. The difference in capital value between an *improved leasehold* ground rent and an *improved freehold* ground rent is, generally, taken at from two to three years' purchase, the former being computed at, say, 22½ years', and the latter at 25 years' purchase, and which difference represents the margin of special value which the acquisition of the ground rent offers to the land-owner A.

III. B may, instead of selling for a capital sum as described in paragraph II., arrange for the extra rent to be taken into account in discharge of the aggregate rental of £200. The ground rents payable, therefore, by C and D for forty houses at £5 each would be sufficient to cover this liability. B would thus be entitled to leases of the sites of the remaining sixty houses (which he has himself agreed to lease to E and F at rents of £5 each) at a nominal rent of a peppercorn. In this case B would make no direct profit on the first forty houses built, but would become entitled to an improved leasehold ground rent of £5 on each of the last sixty houses, and which he might dispose of in the most advantageous way that presented itself.

IV. B may, instead of selling to the land-owner A, dispose of his interest in the improved ground rents to the builders C, D, E, and F, thus entitling them to take up leases from the land-owner at the £2 ground rent at which he had agreed to let to B, instead of at the £5 ground rent which they had agreed to pay to B ; or, B can sell to the builders the right to take up their leases of the last sixty houses at a nominal peppercorn instead of at the rent of £2 or £5.

V. B may sell to a purchaser the *improved leasehold* ground rents—that is, the right to receive a nett rent of £3, per annum, in respect of each house for a period of 99 years.

As previously indicated, these alternative methods of disposal are more especially applicable to comparatively small properties where the outlay necessary for development is borne by the lessee, and that are suitable for speculative building. They might also be adopted by a speculative purchaser, as well as by a lessee of building land. Such methods, however, are seldom encouraged on larger estates where the roads and sewers are formed by the land-owner, and where the higher ground rents agreed to be reserved in consequence of such expenditure cannot be appreciably increased without impairing their security.

Where, in cases of extraordinary expenditure, the rental value of the houses, when built, is sufficient to adequately secure larger ground rents than have been agreed to be reserved in the leases under which they are to be held, it is not unusual, either under a clause in the building agreement, or under subsequent arrangements, for the builder to *improve* his ground rent, that is, to accept leases from the land-owner at higher ground rents than were agreed on, upon payment by the land-owner of a certain number of years' purchase of the excess of the ground rents actually reserved over those originally agreed to be paid.

The development of properties under the leasehold system has been severely condemned by many well-known social reformers, and cases of hardship have undoubtedly occurred on the expiration of leases, more particularly where the lessees had built up an important business, and which they could not remove to other premises without losing much of the trade and goodwill. In such cases it has been open for the ground landlords to dictate their own terms, and which the lessees have been obliged to accept. It may, therefore, be argued that the equitable rights of lessees of business premises should be secured by the lessor granting to them, for a consideration, the option of renewing their leases at a fair rent, to be mutually agreed between the parties, or to be determined by a competent tribunal of professional men.

For residential properties, however, the system has been found to offer many advantages as proved by the evidence given before the Select Committee of the House of Commons on Town Holdings. The report states that 'The Committee agree with the opinion that the plan of letting land for building upon an annual rent, which is a leading feature of the leasehold system, possesses considerable advantage and convenience; and they have, on the whole, come to the conclusion that, except in places where the sentiment of the district is strongly opposed to leaseholds, houses are built and building estates are developed more rapidly on the leasehold system than on that of freehold purchase, and that in consequence of the large supply of houses thus caused occupiers obtain the benefits of lower rents and greater opportunities of selection.'

(2) *The Freehold Purchase or Rent-charge System.*—This may consist of either the sale of the fee-simple outright, with or without restrictions as to user, the purchase money being generally paid in a lump sum, or the freehold may be conveyed subject to the payment of an annual rent-charge, thus forming a practically perpetual annuity, as in the case of—

(*a*) The chief-rent system.
(*b*) The 999 years' lease.
(*c*) The Scottish feu system.

There are various modifications of the above methods, some land-owners being willing to build the houses to purchaser's own plans, and sell subject to payment by instalments; but as this mode of procedure can only be adopted where large funds are available, it is seldom favoured.

In the development of seaside resorts, land speculators often dispose of the fee-simple in small plots, a large proportion of which are bought by people of small means as an investment, and which they hold until able to let to a builder under lease, or to sell outright. In order to effect such sales, exceptional facilities are offered in the shape of free conveyances, and payment by instalments, the business being often preceded by a free luncheon.

Combination of Systems.—In some cases developments partake of the advantages of both the leasehold and freehold purchase systems. The method generally adopted, in the Metropolitan districts, by one of the most expert speculators known to the writer is to purchase the fee-simple of a block of 10–20 acres of land, after the roads and sewers have been formed by the vendor, and to let it, in sections, under agreements for 99 years' leases, to builders at ground rents sufficiently above the aggregate cost price to permit of the speculator discharging all legal and surveying costs, becoming security to the builder's merchants for payment of materials supplied, and of paying a premium to the builder upon the sale of his leasehold interest in each house. Arrangements are made whereby a deposit of about 10 per cent. is paid by the purchaser of the lease, and the balance is raised through building societies, who are guaranteed by the speculator against loss, until sufficient instalments have been paid by the borrower to render the unpaid balance quite safe. The ground rents being thus secured are realised in blocks.

The working of this method may be illustrated as follows :—

Dr.	£	*s.*	*d.*
To apportioned cost of plot with 20 ft. frontage @ £3 15*s*. per foot	75	0	0
,, interest @ 5 per cent. during development (1 year)	3	15	0
,, architect's and surveyor's charges @ 10 per cent. (say)	7	10	0
,, legal costs, conveyance, lease, &c. (say)	10	10	0
,, bonus to builder @ 10 per cent. on cost of house (£250)	25	0	0
Expenditure on plot ..	£121	15	0

	£	*s.*	*d.*
Cr.			
By sale of ground rent £3 15*s.*, increased 50 per cent., or £3 15*s.* + £1 17*s.* 6*d.* £5 12*s.* 6*d.* @ 25 years'	140	12	6
Speculator's profit on the transaction	£18	17	6

The profit indicated by these general figures may *prima facie* appear to be excessive, being at the rate of about 25 per cent. on the original outlay of £75, but it should be borne in mind that no deduction has been made in respect of commission on the sale of the house, or of the ground rent, nor has any allowance been provided to cover the speculator's liability to the builder's merchants, or to the building society.

Formulation of Scheme.

Mode of Procedure.—In the formulation of such a scheme as that to which previous reference has been made, the expert surveyor will first make a careful reconnaissance of the property under consideration, as well as of the surrounding districts, in order to grasp the general situation. A large estate will probably comprise blocks of land that are suitable for development as sites for detached residences, semi-detached villas, shops and business premises, workmen's dwellings or factories. It may also include sections that offer special facilities for the improvement of the adjoining town, by being laid out as public or semi-public parks or pleasure grounds, or as sites for municipal or other buildings of a similar character.

These blocks may be more or less independent of each other, but before proceeding with the development or realisation of any particular section, it is essential that some general scheme should be formulated in order that the interests of the estate as a whole, as well as the special amenities of its several sections, should be properly secured. In this connection the bearing of other adjoining properties will also call for consideration, having regard to any improvements, such as the straightening of boundaries, or the exchange of lands, which might be effected by mutual arrangement with other owners. It is not improbable that, on account of difficulties of access or some other peculiarity of situation, certain portions of the estate will be found to be incapable of advantageous development, except in conjunction with adjoining lands belonging to other parties. In such case the preparation of alternative methods of procedure, one indicating how the properties may best be developed together, to the mutual benefit of the respective owners, and the other showing (if possible) the feasibility of developing the clients' own property independently of the other, may often be used to advantage in negotiating arrangements with adjoining owners.

Bye-laws and Plans.—Having satisfied himself on these points, the surveyor will carefully digest the bye-laws in force in the locality, and also ascertain the position, depth, and size of the nearest sewers. He may then proceed to determine the lines of the principal roads and sewers that will be required. To assist him in arriving at a definite conclusion, the surveyor should have a fairly accurate plan of the estate for purposes of reference. A map prepared from the 25-inch Ordnance will serve the purpose, but it will require to be amplified by having the contour lines marked on it at every ten feet of altitude or vertical interval, and the legal boundaries of the property defined.

Roads.—The lines of the proposed principal roads should be so laid out as to afford the means of ready communication with the nearest town, as well as with the railway stations, tram, and omnibus routes. To do this the proposed roads will, probably, have to form connecting links between the main thoroughfares already in existence, but they should be so directed as to shorten, as far as practicable, the distances of the ruling centres before mentioned.

Although such centres may be regarded as governing points in connection with new roads, there are other matters which must not be overlooked. Among the latter may be mentioned the following :—

(1) To reduce the cost by curtailing the length of the new roads as much as possible ;

(2) To make the gradients of the roads uniform as far as practicable, while avoiding cuttings, embankments, and sharp curves ;

(3) To secure a sufficient fall for the drainage ;

(4) To provide for the preservation and enjoyment of any advantages arising from natural peculiarities in the surface configuration of the district ;

(5) To adopt road-lines that will secure an adequate supply of sunshine in the living rooms of the houses to be erected on adjoining sites.

These different factors are often in conflict, and more or less difficulty may be experienced in reconciling them so as to secure the most advantageous result. The first, for instance, suggests the advisability of making the roads in straight lines between the governing points. This method would also yield the greatest length of building frontages assuming that the plots were set out at right angles to the roads. To equalise the gradients of such straight roads would, however, necessitate an expenditure on cuttings and embankments which, with the usual diversity of physical features, would render the idea impracticable. The lines should, therefore, form the shortest route consistent with easy gradients and economy of road construction.

In addition to matters connected with the formation of the roads, the question of water supply would necessarily have to be considered. Inquiries should be made as to whether the property comes within the area of the local service, or if not, whether a sufficient supply is obtainable from other sources at reasonable charges. The same remarks would also be applicable to the supply of electric light or gas.

Contoured Plan.—In order to determine the lines of the principal roads and sewers it will be necessary, in cases of any important variation in surface levels, for the surveyor to plot the contour lines on his working plan, as previously indicated. These contours represent imaginary lines running round a hill at the same level, each contour representing a rise or fall of so many feet. A road which follows a contour line will, therefore, be perfectly level, but at the same time it will generally be a crooked road.

On the reduced plan forming Fig. 2, the contour lines are shown at vertical intervals of ten feet. These lines were laid down from a series of levels starting from the nearest bench-mark, in order that their relative height to Ordnance datum might be given. The height of the point A on the first contour line having thus been determined, the staff was held there and read from the level, which was set up at a convenient distance between the first and second contour lines. The staff was then taken to other points along the first contour line, and shifted about until it gave the same reading. Numbered pegs were then inserted at each of the points so determined, and subsequently picked up from survey lines. The second contour line would be marked out in the same manner as the first, except that the first starting-point would be levelled up from point A instead of from the bench-mark. The same remarks are applicable to the succeeding contour lines.

From the contour lines shown on such a plan, the eye will readily distinguish the relative heights and slopes of different portions of the property by the distance of the contours from one another. The rate of inclination may be more correctly determined by measurement, and a scale applicable to such measurements has therefore been given on the plan.

If a scale be applied to the line A, B, it will indicate a distance of about 305 feet between the first and second contour lines, and, this, representing a vertical interval of 10 feet, will show that the gradient is 1 in 30·5. The same lineal measurement on the scale of angles will show the angle of slope to be about 1°50′.

Gradients.—For the purpose of facilitating reference, a brief statement of gradients, with the angles of slope which they represent, is given hereunder :—

Gradient.	Angle of slope.	Rise in feet per mile.
1 in 100	0° 34′	52·8
1 ,, 50	1° 8′	104·16
1 ,, 40	1° 26′	132·6
1 ,, 30	1° 54′	176·0
1 ,, 25	2° 18′	211·2
1 ,, 20	2° 52′	264·0
1 ,, 15	3° 49′	352·0
1 ,, 10	5° 42′	528·0

Drainage.—Whilst dealing with the lines of the principal roads, the question of drainage must also be borne in mind. By means of the contours the natural water-shed lines can be traced, and the main drainage determined. It will be possible, therefore, to ascertain whether the drainage of any one section of an estate will be dependent on sewers being previously laid through other portions, or whether each block can be dealt with independently. It sometimes happens that the surface configuration will permit of a block being drained into existing sewers, in two different directions. In such case it is well to ascertain whether each of the sewers is of sufficient capacity to take the additional drainage, and whether the same conditions are likely to be in existence at the time that the land under consideration will have become ripe for development.

Arrangements with Local Authorities.—Other points will probably call for treatment with the local engineer. Indeed, it is frequently desirable to discuss with him, in some fullness, the proposed scheme in regard to its bearing on the future development of the adjacent town. The owner's surveyor will, of course, have regard to his instructions as to the extent that he may disclose the object of his inspection, but, speaking from our own experience, we have invariably found that, if treated confidentially, municipal engineers have most courteously placed at our disposal such reliable information as was at their command, not only regarding matters connected with drainage, but as to the growth of the town generally, including the rate of increase of population during recent years, and the reason for any abnormal increase of population; the number and kind of houses that have been erected and that are in course of erection; the extent of 'over-building' (if any) during recent years and the period of waiting that ensued; the prospects of the town's progress in the immediate future, and the provisions that have been made to meet such expansion; the amount of the present and that of the probable future general and special rates, together with other matters more or less connected with the growth and improvement of the locality. Moreover, it may be desirable in the interests of the estate to make certain provisional arrangements with the Local Authorities regarding, *inter alia*, the widening of certain main thoroughfares that intersect or bound the property, the extension of public parks, pleasure, or recreation grounds, marine parades, piers, or harbours, easements for a new or extended system of sewerage, or other public improvements. In some cases a modification of the bye-laws may be found necessary in order that certain physical difficulties may be overcome, or to permit of greater economy in development. If, however, the owner, or his private agent, should prefer to negotiate direct with the Local Authorities concerning such matters, the surveyor's duty may well be confined to drawing attention, in his report, to the nature and effect of such improvements, and at the same time giving suggestions as to the provisional arrangements that will be necessary, in the first place, to protect the interests of the owner, and, secondly, to permit of the improvements being carried out by the Authorities on a fair and equitable basis.

Public Companies.—Having regard to the importance of cheap transit in connection with building development, the surveyor will pay particular attention to this matter, and endeavour to ascertain whether arrangements can be made with the local railway companies in regard to each or all of the following items: (1) To build a station on the property, the land-owner contributing the necessary land for that purpose, or at a point within easy distance of the estate; (2) to improve the existing train service; or (3) to issue cheap season tickets. In order to secure these advantages the land-owner may have to subsidise the returns obtained by the company until the traffic becomes sufficiently remunerative.

The question of extending any local tram service may also call for consideration in connection with sections of an estate that may be specially suitable for artisans' and workmen's dwellings.

Adjoining Owners.—In connection with adjoining owners, it is often found that, in order to afford the necessary means of access to main thoroughfares, certain unremunerative lengths of new road have to be made. The depth of the land, on one or both sides of the lengths of road, may not be sufficient to permit of its being utilised for building purposes by the person making the road. The adjoining owners are sometimes willing to pay a fair proportion of the cost of making such lengths of road, and of the value of the road site, in return for the right to use the road in the development of their own land. If, however, they should be unwilling to contribute towards the improvement, a strip of land along one or both sides of the new road is often retained, in order to prevent the adjoining owners from acquiring a right of user. This reservation, however, renders the owner of the strip liable for the charges for ultimately ‘ making up ’ of the road, and for this reason it is, sometimes, deemed advisable to run a road alongside another owner’s land so as to throw such charges on him.

Form of Report.—For the assistance of the younger members of the profession, we give hereunder some suggestive marginal headings and sub-headings for a report, such as that referred to, on the prospective development of an estate :—

Object of Report.—Limit of instructions—Points specifically named for consideration.

Situation.—Altitude—Advantages of situation—General character of local town—Nearest railway station (main or branch line)—Distance of nearest city, manufacturing town, or fashionable resort — Tram and omnibus routes.

Geological Formation.—Nature of soil and subsoil—Effect on sanitary and hygienic qualifications—Cost of excavating supply of road and building materials.

General Characteristics.—Dominating features—

Surface configuration—Natural capabilities for division into independent blocks—Residential, business, and manufacturing sections—Facilities for public improvements—Local rates.

Local Bye-laws.—Effect on laying out—Road-making — Lighting — Sewering — Power to acquire intervening lands for improvements.

Roads.—General character of existing roads—Connections with main thoroughfares—Principal roads required—Gradients—Local materials available.

Drainage.—Local system of sewerage (separate or combined)—Nearest existing sewers—Size and depth—Possibilities of extension—Cost—Lines of principal sewers required.

Water Supply.—Local methods of supply—Quantity—Quality—Possibilities of increased supply—Height of delivery—Charges.

Lighting.—Local supplies—Gas—Electricity—Proximity of existing mains.

Plans.—Plans showing: Existing holdings—Contour lines—Lines of principal roads and sewers required—Alternative methods of development.

Potentialities of Development.—Special natural facilities—Growth of locality—Future prospects—Travelling facilities—Period required for ripening—Development in sections—Adaptation of scheme.

Suggestions and Recommendations.—Management during maturing period—Arrangements with adjoining owners—Improvements to be effected: Tree planting, straightening boundaries, closing occasional roads and footpaths—Preliminary steps in realisation—Portions to be first disposed of — Sales — Lettings — Restrictions and stipulations — Adherence to general principles of scheme—Administrative procedure.

CHAPTER IV

POWERS AND REQUIREMENTS OF METROPOLITAN AND LOCAL AUTHORITIES

Administrative Divisions.—For administrative purposes the whole of England and Wales is divided as follows :—

I. The Administrative County of London ;
II. All districts outside the Metropolis.

I. The Metropolitan District.

The administrative County of London includes the City of London, together with the following Metropolitan Boroughs, the whole embracing an area of about 118 square miles in extent, with a population in 1901 of 4,536,541 persons :—

Battersea
Bermondsey
Bethnal Green
Camberwell
Chelsea
Deptford
Finsbury
Fulham
Greenwich
Hackney
Hammersmith
Hampstead
Holborn
Islington
Kensington
Lambeth
Lewisham
Paddington
Poplar
St. Marylebone
St. Pancras
Shoreditch
Southwark
Stepney
Stoke Newington
Wandsworth
Westminster
Woolwich

The law governing matters relating to estate development within this area is comprised chiefly in the London Building Act, 1894, and Amendment Acts, 1898 and 1905, sections of the Metropolis Management Act, 1855, Metropolis Management Amendment Acts of 1862, 1878, and 1890, which are now in force, and the Public Health (London) Act, 1891.

Powers of Metropolitan Borough Councils.—Each Borough Council is the sanitary authority for its own borough, but, with the exception of certain matters relating to street alignment for which the City Corporation is the authority in the City, the administration of the laws relating to the laying out of building land, the formation of new streets, or alterations to and the construction of new sewers, is virtually carried out by the London County Council (L.C.C.[1]). The Council have power to make bye-laws and regulations applying to the whole of the metropolis for many purposes, and to compel the Borough Councils to enforce them. As in the case of Local Authorities outside London, these bye-laws must be confirmed at a subsequent meeting of the Council, and are subject to the confirmation of the Local Government Board (L.G.B.[1]) before they can become operative. It is the duty of the L.C.C. to give public notice of their intention to apply to the L.G.B. for the allowance of any such bye-laws at least two months before making the application; a copy of the proposed bye-laws must also be kept at the County Hall for inspection for at least one month before the application is made.

Definition of Bye-Law.—A bye-law has been defined as a law made by some authority less than Parliament in espect of a matter specially referred to the authority by statute, and not provided for by the general law of the land. It must provide something in addition to, but consistent with, the statute under which it is made, and must come within the scope of the powers under which it is made, otherwise it may be *ultra vires*, and consequently bad.

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[1] The following abbreviations are used throughout this chapter, viz.:—‘L.G.B.’ for Local Government Board, ‘L.C.C.’ for London County Council, and ‘L.A.’ for Local Authorities.

Definition of Regulations.—Regulations are less formal than bye-laws, and do not require the assent of the L.G.B., except in cases in which a penalty is provided. All that is necessary is that they shall be passed at a meeting of the L.C.C., and no formal publication is legally needed.

Formation of New Streets.—In the London Building Act the term ‘ street ’ comprises the whole or any part of any highway, and any road, bridge, lane, mews, footway, square, court, alley or passage, whether a thoroughfare or not. The term ‘ way ’ includes any public roadway or footpath not being a street, and any private roadway or footpath which it is proposed to convert into a highway, or to form, lay out, or dedicate as a street. The term ‘ roadway ’ in relation to any street or way means and includes the whole space open for traffic, whether carriage traffic and foot traffic, or foot traffic only (sec. 5).

Any person intending to lay out a new street must first obtain the sanction of the Council, and applications should be addressed to the Superintending Architect, County Hall, Spring Gardens, S.W., at least two months before commencing operations, and be in accordance with the subjoined regulations. A copy of each plan for the formation of a new street, or of the adoption of a way for a street, should also be sent to the L.A. in whose district the proposed street is situated, with the request that they will inform the L.C.C. within fourteen days whether they have any suggestions to make with reference to such plan.

Regulations above referred to—

I. General.

All applications must be in writing on foolscap paper, and all drawings (including plans, sections, and elevations) must be on tracing linen of sufficient size to permit of the approval of the Council being endorsed thereon.

The scale to which drawings are made must be drawn thereon and not expressed in words. The north point must be indicated on all plans.

The site must be coloured pink, the proposed building red, existing buildings grey, and any land to be dedicated and left open for the use of the public blue.

The name and address of the person on whose behalf the application is made must be stated. Reference must be made to the section of the Act under which sanction is sought and particulars must be furnished as to the nature of the application and the situation of the street, building, or structure.

All drawings must be sent in duplicate, and be drawn on the unglazed side of the tracing linen.

II. Particulars as to Drawings required in each Case.

1. *New Streets, &c. Sec.* 7 *and sec.* 10.

Plans must be to a scale of 88 feet to the inch, and must be accompanied by longitudinal sections to the same horizontal scale, but to a vertical scale of 11 feet to the inch showing the natural and intended surface levels of the streets (computed from Ordnance or some other fixed datum) and by cross-sections to a scale of 22 feet to the inch.

A key plan of the locality showing the surrounding property must also be sent.

The names proposed to be given to the streets must be submitted; they must be such as are not already in use.

In the event of the application being sanctioned, two additional copies of the plans will be required.

In the case of the widening of existing streets under sec. 10 (4), sections will not be required.

5. *Laying out New Streets on a Cleared Area. Sec.* 44.

In addition to the plans required under Regulation II. (1), and (so far as any relaxation or modification of the rules of Part V. of the Act may be asked for) under II. (3), a plan will be required to the scale of 44 feet to 1 inch showing the width of all old streets on the area, and the extent and approximate height of all old buildings thereon to a scale of one-eighth of an inch to the foot, as well as of the proposed new streets and buildings.

11. *Naming of Streets and Numbering of Houses.*

Persons laying out new streets or building rows of houses would save themselves much inconvenience and expense with reference to leases and the numbering of houses required by the Council under the statute by observing the following rules:—

St. Paul's Cathedral is recognised as a central point, and the numbering of houses begins at the end or entrance of the street nearest to that building, except where a street leads from a main thoroughfare. Taking, therefore, the sides of a street as left and right (assuming that the back is towards St. Paul's) the odd numbers will be assigned to the left hand side, and the even numbers to the right hand side.

No name is to be used for a street unless with the approval of the Council, and it must be a name associated, if possible, with the locality, and consisting, preferably, of one word with the addition of 'street,' 'road,' or other like term, and not already in use within the county.

Only such streets as are leading thoroughfares of considerable length may be designated 'roads.'

No street under 50 feet in width may be called an 'avenue.'

The names 'gardens,' 'groves,' and 'crescents' may only be used when the terms seem appropriate.

Names in some way associated with the locality are preferred.

Names for terraces or places, or other blocks of houses and sections of streets, usually known as subsidiary names, are not recognised.

Any person interested in property affected by any order of the Council for re-naming streets, or re-numbering houses, is permitted, on application, to make a copy of the order and a tracing of the plan attached thereto, or a certified copy of the order and plan may be furnished to him on his paying the cost of making the same.

London Building Act, 1894.—Hereunder is given the full text of the more important sections of the London Building Act, 1894, applicable to street formation :—

SECTION 8.—EVIDENCE OF COMMENCEMENT OF STREET.

For the purposes of this part of this Act (*relating to the Formation and Widening of Streets*) a person shall be deemed to commence to form or lay out a street if he erect a fence or other boundary or lay down lines of kerbing or level the surface of the ground so as to define the course or direction of a street or if he form the foundations of a house in such manner and in such position as that such house will or may become one of three or more houses abutting on or erected beside land on which a street is intended to be or may be thereafter laid out or formed. Provided that no person shall be deemed to commence to form or lay out a street if he do any of the acts in this section mentioned for some purpose other than that of forming or laying out a street.

SECTION 9.—GROUNDS FOR REFUSAL TO SANCTION PLANS OF STREETS.

In any of the cases following but in no other case (that is to say) :—

1. Where any street is proposed to be formed or laid out for carriage traffic without being of or being widened

to the full width of 40 feet clear or such other width as may be required under the provisions of this Act;

2. Where any street is proposed to be formed or laid out for foot traffic only without being of or being widened to the full width of 20 feet clear;

3. Where any street exceeding 60 feet in length or any street not exceeding 60 feet in length of which the length is greater than the width is proposed to be formed or laid out without being open at both ends from the ground upwards;

4. Where any street not being within the City is proposed to be formed or laid out in such manner that such street will not at and from the time of forming and laying out the same afford direct communication between two streets such two streets being (where it is intended to form or lay out such street for carriage traffic) streets formed and laid out for carriage traffic;

5. Where it is proposed to form or lay out any street not being within the City for foot traffic only and it appears to the Council that such street should not be formed or laid out for foot traffic only or that such street should be formed or laid out for foot traffic only subject to conditions;

6. Where the street is proposed to be formed or laid out for carriage traffic with any gradient steeper than one in twenty;

7. Where it is proposed to form or lay out any street in such manner as to be in contravention of any bye-law of the Council;

it shall be lawful for the Council by order at any time within the period of two months after the receipt of the application to refuse to sanction or to sanction subject to such conditions as they may by such order prescribe the formation or laying out of such street for carriage traffic or for foot traffic only as the case may be provided that the Council shall within such period give notice to the applicant of such order stating fully all their reasons for such refusal or the imposition of such conditions as the case may be:

Provided that if within the said period of two months the Council fail to give notice of the refusal to sanction the formation or laying out of such street or of their disapproval of any such plan or section they shall be deemed to have given their sanction thereto.

SECTION 10.—ADAPTATION OF WAYS FOR STREETS.

1. Before any person commences—

(*a*) To adapt for carriage traffic any street or way not previously so adapted or to use or permit to be used for carriage traffic any street or way not previously so adapted;

(*b*) To adapt as a street for foot traffic only or as a public footway any way not previously so adapted;

such person shall make an application in writing to the Council for their sanction thereto and such application shall be accompanied by plans and sections and such particulars in relation thereto as may be required by printed regulations issued by the Council and the Council shall forthwith communicate every such application to the local authority and no person shall commence to execute any such work without having obtained the sanction of the Council.

2. Within two months after the receipt of any such application the Council shall either sanction the plans and sections or give notice to the applicant of their disapproval thereof stating fully all their reasons for such disapproval. Provided that if within the said period of two months the Council fail to give notice of their disapproval of any such plan or section they shall be deemed to have given their sanction thereto.

3. A person shall be deemed for the purposes of this Part of this Act (*relating to the Formation and Widening of Streets*) to commence to execute a work within the meaning of this section if he erect a fence or other boundary or lay down lines of kerbing or level the surface of the ground so as to define the course or direction of a work within the meaning of this section or if he form the foundations of a house in such manner and in such position as that such house will or may become one of three or more houses abutting on or erected beside land on which a street intended to be or may be thereafter laid out or formed.

Provided that no person shall be deemed to commence to execute a work within the meaning of this section if he do any of the acts in this sub-section mentioned for some purpose other than that of executing a work within the meaning of this section.

4. Before any person commences to widen on either side to a less extent than the prescribed distance any part of a street or way which (being adapted for carriage traffic) is less than 40 feet in width or (being adapted for foot traffic only) is less than 20 feet in width he shall give notice in writing to the Council accompanied by a plan showing the extent of the proposed widening and no person shall commence to execute any such widening until after the expiration of two months from the date of such notice unless with the previous sanction of the Council.

SECTION 11.—GROUNDS FOR REFUSING TO SANCTION ADAPTATION OF WAYS FOR STREETS.

In any of the cases following but in no other case (that is to say) :—

1. Whenever it is proposed to adapt for carriage traffic any street or way (not previously adapted) where there are houses or buildings either on both sides thereof or only on one side thereof without a distance of at least 20 feet clear being left between the centre of the roadway and the nearest external wall of the houses or buildings on the side of the street or way to which the measurement is taken or (if there be forecourts or other spaces left between such external wall and the roadway) without there being a distance of at least 20 feet clear between the centre of the roadway and the external fences or boundaries of such forecourts or other spaces ;

2. Where it is proposed to adapt as a street for foot traffic only or as a public footway any way not previously so adapted without the same being of or being widened to the full width of 20 feet clear measured as aforesaid ;

3. Where any such adaptation would result in the formation of a street exceeding 60 feet in length or a street not exceeding 60 feet in length of which the length is greater

than the width and in either case not being open at both ends from the ground upwards;

4. Where any such adaptation would result in the formation of a street not being within the City and not affording direct communication between two streets such two streets being (where it is intended to form or lay out such street for carriage traffic) streets formed and laid out for carriage traffic;

5. Where the adaptation will result in the formation or laying out of a street not being within the City for foot traffic only and it appears to the Council either that such street should not be formed or laid out for foot traffic only or that such street should be formed or laid out for foot traffic only subject to conditions;

6. Where the adaptation would result in the formation of a street for carriage traffic with any gradient steeper than one in twenty;

7. Where the adaptation is proposed to be made in such a manner as to be in contravention of any bye-law of the Council;

it shall be lawful for the Council by order at any time within the said period of two months after the receipt of the application to refuse to sanction or to sanction (subject to such conditions as they may by such order prescribe) the adaptation proposed by the application. Provided that the Council shall within such period give notice to the applicant of such order stating fully all their reasons for such refusal or the imposition of such conditions as the case may be. Provided also that if within the said period of two months the Council fail to give notice of their refusal to sanction such adaptation or of their sanction of the adaptation subject to conditions they shall be deemed to have given their sanction thereto.

SECTION 12.—GREATER WIDTH OF STREET MAY BE REQUIRED IN CERTAIN CASES.

In any case where it is intended—

(*a*) To form or lay out any street not being within two miles of St. Paul's Cathedral for carriage traffic;

(*b*) To adapt or permit to be used for carriage traffic any street or way (not being within two miles of St. Paul's Cathedral) not previously so adapted; and the Council shall deem it expedient in the public interest that the street or way should by reason of its length or importance or in consequence of its forming or being so situate as to be likely to form part of an important line of communication or for other sufficient reason be of greater width than 40 feet clear they may make it a condition of their sanction that the street or way shall be throughout or in such part as they may direct of a greater width than 40 feet but nothing in this section shall authorise the Council to require a greater width than 60 feet:

And before requiring that any street or way shall be wider than 40 feet the Council shall give notice of their intention to the local authority in order that the local authority if they think fit may make a representation to the Council.

SECTION 15.—AS TO COMPENSATION IN CERTAIN CASES.

In any case where—

1. The Council under this Part of this Act (*relating to the Formation and Widening of Streets*) makes it a condition of their sanction to—

(*a*) the formation or laying out of any street for carriage traffic over land which either at the commencement of this Act or at any time within seven years previously has or shall have been occupied by buildings or by market garden; or

(*b*) the adaptation or use for carriage traffic of any street or way not previously so adapted or used

that the street or way shall be throughout or in any part of a greater width than 40 feet; or

2. The Council determine that the prescribed distance from the centre of the roadway shall be greater than 20 feet; the Council shall be liable to pay to the owner of land or buildings required for such greater width or such greater prescribed distance compensation for the loss or injury (if any) sustained by him by such requirement. The amount of such compensation if not agreed within two months from the time of such condition being made or determination

arrived at may (unless the Council waive the condition or determination) be recovered in a summary manner except where the amount of compensation claimed exceeds fifty pounds in which case the amount thereof shall be settled by arbitration according to the provisions contained in the Lands Clauses Acts which are applicable where questions of disputed compensation are authorised or required to be settled by arbitration and for that purpose these Acts so far as applicable shall be deemed to be incorporated with this Act :

Provided always that within two months from the time of such condition or determination being made or arrived at if the amount of such compensation has not been settled before the expiration of such time it shall be lawful for the Council to waive such condition or determination. Provided also that if the Council waive such condition or determination they shall pay to the owner the reasonable costs charges and expenses incurred by him in consequence of such condition or determination and in connection with the negotiations for the settlement of the amount of compensation :

For the purpose of this section the expression ‘ owner ’ has the same meaning as in the Lands Clauses Acts.

The important bye-law made by the Metropolitan Board of Works in 1857, and since adopted by the L.C.C. as a Metropolitan Local Amendment Act, is as follows :—

BYE-LAW AS TO THE FORMATION OF NEW STREETS IN THE METROPOLIS.

1. Four weeks at the least (see sec. 9, sub-sec. 7 of London Building Act, 1894) before any new street shall be laid out, written notice shall be given to the London County Council at their Office, Spring Gardens, in the County of Middlesex, by the person or persons intending to lay out such New Street, stating the proposed level and width thereof, and accompanied by a plan of the ground showing the local situation of the same.

2. Forty feet at the least shall be the width of every New Street intended for carriage traffic; 20 feet at the least shall be the width of every New Street intended only for foot traffic; Provided that the said width, respectively, shall be construed to mean the width of the carriage and footway only, exclusive of any gardens, forecourts, open areas, or other spaces in front of the houses or buildings erected or intended to be erected in any street.

3. Every New Street shall, unless the London County Council otherwise consent in writing, have at the least two entrances of the full width of such Street, and shall be open from the ground upward.

4. The measurement of the width of every New Street shall be taken at a right angle to the course thereof, half on either side of the centre or crown of the roadway to the external wall or front of the intended houses or buildings on each side thereof; but, where forecourts or other spaces are intended to be left in front of the houses or buildings, then the width of the Street, as already defined, shall be measured from the centre line up to the fence, railing, or boundary dividing or intended to divide such forecourts, gardens, or spaces from the public way.

5. The carriage-way of every New Street must curve or fall from the centre or crown thereof at the rate of three-eighths of an inch at the least, for every foot of breadth.

6. In every New Street the kerb to each footpath must not be less than 4 inches nor more than 8 inches above the channel of the roadway, except in the case of crossings, paved or formed, for the use of foot passengers; and the slope of every footpath towards the kerb must be half an inch to every foot of width, if the footpath be unpaved, or not less than a quarter of an inch to every foot of width if the footpath be paved.

7. In this Bye-law the word 'Street' shall be interpreted to apply to and include any highway (except the carriage-way of any turnpike road), and any road, public bridge (not being a county bridge), lane, footway, square, court, alley or passage, whether a thoroughfare or not; and a part of any such highway, road, bridge, lane, footway, square, court, alley, or passage.

8. In case of any breach of the regulations contained in this Bye-law, the offender shall be liable for each offence to a penalty of Forty Shillings ; and in case of a continuing offence to a further penalty of Twenty Shillings for each day after notice thereof from the London County Council.

By the 40th Section of the Local Government Act, 1888, the powers of the Metropolitan Board of Works are transferred to the London County Council, and any notice which by the above Bye-law is directed to be given to the Board must henceforth be given to the Council, and any consent which might have been given by the Board may be given by the Council, and any notice which might have been given under the said Bye-law by the Board to an offender may be given by the Council.

Building Line.—Under the London Building Act, 1894, it is provided that no part of the external wall of any building or forecourt shall be erected at less than 20 feet from the centre of the roadway of any street without the consent in writing of the L.C.C. ; and where, either by reason of the length or importance of the street or way, or for other sufficient reason the Council shall deem it expedient in the public interest, it shall be lawful for them to determine what the prescribed distance shall be, such greater distance not exceeding 30 feet from the centre of the roadway, as the Council shall see fit (sec. 13) ; the Council being liable to pay to the owner of the land or building required for such greater width compensation for the loss or injury (if any) sustained by him by such requirement (sec. 15).

No building is to be erected beyond the general line of buildings (to be determined, if necessary, by the Superintending Architect) in any street, place, or row of houses in which the same is situated, in case the distance of such line of buildings from the highway does not exceed 50 feet, without the consent, in writing, of the Council. Nor is a house to be erected within 50 feet of the highway when the distance of the line of buildings therefrom amounts to or exceeds 50 feet, without such consent (sec. 22). In case any building or structure which shall in any part project beyond the general line of buildings in a street shall be taken down to an extent exceeding one-half of the cubical extent of such building or structure, it shall be lawful for the Council to require the same or any new building to be set back to such line as the Council shall direct, subject to the Council making compensation to the owner of such building for any damage and expense which he may sustain (sec. 23).

Open Spaces about Buildings.—All domestic buildings erected after the commencement of the London Building Act, 1894, and abutting on new streets, shall have a space provided in the rear of every such building of an aggregate extent of not less than 150 square feet free from any erection above the level of the adjoining pavement (see Fig. 1), the depth of such space in every part to be not less than 10 feet from the building (sec. 41). No new building can, without the consent of the Council, be erected on the side of a new street so that the height of such building shall exceed the distance of the front or nearest external wall of such building from the opposite side of such street. Where such building is erected on a corner plot, the height of such building is to be regulated by the wider of the streets to which it abuts, and also so far as it abuts upon the narrower of such streets to a distance of 40 feet from the wider street (sec. 49).

Taking over of New Streets.—Under the Metropolis Management Act, 1855, it is provided that where the owners of the houses forming the greater part of any new street laid out or made, or hereafter to be laid out or made, which is not paved to the satisfaction of the Council, be desirous of having the same paved, or if the Council deem it necessary or expedient that the same shall be so paved, then and in either of such cases the Council shall well and sufficiently pave the same, either throughout the whole breadth of the roadway and footpath thereto, or any part of such breadth, and from time to time keep such pavement in good and sufficient repair; and the owners of the houses forming such street shall, on demand, pay to the Council the amount of the expenses incurred in providing and laying such pavement (sec. 105).

Under the Metropolis Management Amendment Act, 1890, the Council may from time to time execute any necessary works of repair to any carriage road within their district which shall have been used for not less than six months for public traffic, and which may not at the time of such repair have become repairable by them, with power to apportion and recover the expense in the same manner as if such expense had been incurred in the paving of a new street as described in the preceding paragraph, but without prejudicing or affecting the powers of the Council to apportion and recover the expense of paving such road when the same shall be paved as a new street under the Metropolis Management Acts (sec. 3).

It has been held that a street or way cannot become a highway maintainable out of the rates until it is in accordance with the Act (*Stroud* v. *Wandsworth*, D.B.W. 1894, 2 Q.B.).

In cases where, after the commencement of the London Building Act, 1894, a building has been erected at less than the prescribed or sanctioned distance from the centre of a private way, it is provided that such way shall not become a highway, except (1) a written notice shall be served upon the Council of the proposal to make the way a public highway; or (2) that the Council are satisfied that the conditions and terms sanctioned by the Council or tribunal of appeal have been complied with (sec. 16).

Where such a street has been made in accordance with the conditions and terms sanctioned by the Council, it is implied that after a written notice has been served upon the Council of the proposal to make it a public highway, and they are satisfied as to its completion, such street will be taken over at the end of two months.

Sewers.—Under the Metropolis Management Act, 1855, the L.C.C. is responsible for providing proper traps or other coverings, or by ventilation, or by such other ways and means as shall be practicable for that purpose, to prevent the effluvia of sewers from exhaling through gullyholes, gratings, or other openings of sewers in any of the streets or other places within the county (sec. 71). No building is to be erected in, over, or under any sewer vested in the L.C.C., or in any Metropolitan Borough, without their consent in writing being first obtained (sec. 204). It is lawful for any person, at his own expense, to make or branch any drain into any of the sewers vested in the L.C.C. or any Metropolitan Borough, such drain being of such a size and of such conditions and branched to such sewer in such a manner and form of connection in all respects as the Council shall direct or appoint (sec. 77).

The Metropolis Management Amendment Act, 1890, provides that any person making any sewer, or branching any sewer or drain into any sewer vested in the Council without first having obtained the approval in writing of the Council, or otherwise than in accordance with a plan and section thereof approved by the Council, or causing any such sewer or drain to be so made or branched, shall be liable to a penalty not exceeding fifty pounds (sec. 4).

Bye-law, 1856.—A bye-law made by the Metropolitan Board of Works in 1856, and continued in force by the 123rd section of the Local Government Act, 1888, provides that :—

> No new sewer shall be made without the previous approval of the London County Council; and all Vestries and District Boards proposing to construct new sewers shall, before commencing any works for that purpose, submit to the said Council plans of the streets or places in which it is proposed to construct new sewers, drawn upon tracing cloth, to a scale of 5 feet to the mile, with the position of the proposed sewers shown thereon, and longitudinal sections of such sewers drawn to the same horizontal scale and to a vertical scale of 11 feet to an inch, with the heights from Ordnance datum to the invert of the proposed sewers figured, and the rate of inclination specified therein. Also cross-sections of the proposed sewers, drawn to a scale of half an inch to a foot, with a statement of the thickness and a description of the materials intended to be used in their construction.
>
> When it shall be intended to abandon wholly or in part, or to extend, contract, or alter, any design for a sewer previously submitted to and approved by the Metropolitan Board of Works or the London County Council, notice in writing of such intention shall be given to the said Council, accompanied by plans and sections, as hereinbefore described, showing the extension, contraction, or alteration which may be intended; and no such abandonment, extension, contraction, or alteration shall be permitted without the previous approval in writing of the Council.

Three clear days' notice in writing shall be given to the London County Council by a Vestry or District Board previously to the connection of any sewer or drain with a main sewer, and the necessary junction for that purpose shall be made by such Vestry or District Board to the satisfaction of the Council.

Houses on Low-lying Land.—In regard to the drainage of dwelling-houses on low-lying land, the London Building Act, 1894, provides that :—

It shall not be lawful for any person upon land of which the surface is below the level of Trinity high-water mark and which is so situate as not to admit of being drained by gravitation into an existing sewer of the Council to erect any building to be used wholly or in part as a dwelling-house or to adapt any building to be used wholly or in part as a dwelling-house except with the permission of the Council and subject to and in accordance with such regulations as the Council may from time to time prescribe with reference to the erection of buildings on such land (sec. 122).

Trinity high-water mark is the level of the lower edge of a stone fixed in the base of the river wall on the east side of the Hermitage entrance to the London Docks, and is 12·48 feet above Ordnance datum.

II. DISTRICTS OUTSIDE THE METROPOLIS.

Local Authorities.—For the purpose of administering the 1875 Public Health Act, the whole of England and Wales (except the Administrative County of London previously described) was divided into districts of two kinds, known as 'Urban Sanitary Districts' and 'Rural Sanitary Districts,' these being subject, respectively, to the jurisdiction of the Urban and Rural Sanitary Authorities. Under the Local Government Act, 1894, Urban Sanitary Authorities were divided into Urban District Councils and Borough Councils, and the Rural Sanitary Authorities became Rural District Councils.

Powers of Local Authorities.—Under the Public Health Act, 1875, and amending Acts, the Local Authorities above referred to have the power to make bye-laws for a great number of different purposes, and including the construction of new streets and buildings, the proper management of pleasure grounds, and other matters connected with the development of building estates. The highway powers of District Councils are similar in urban and rural districts, but the power to deal with private streets, and to make bye-laws relating to new streets, is not exercised by Rural Councils unless they acquire urban powers. As in the case of the L.C.C., bye-laws made by the L.A. do not take effect until they have been submitted to and confirmed by the L.G.B., which has power to allow or disallow them, as the Board thinks fit. It is the duty of the L.G.B. to consider objections raised by any ratepayer in regard to the likelihood of, and the policy underlying, the proposed bye-laws; but the Board's confirmation will not make valid any bye-law which is repugnant to the general law.

The local bodies sometimes think that they have cause to feel aggrieved by the way in which the L.G.B. exercises its authority, but the disposition shown by the Board during recent years to check rather than encourage the zeal of Local Authorities is being fully appreciated by the great body of ratepayers. This is especially the case in regard to the further extension or arbitrary application in rural localities of bye-laws which are reasonably applicable only to urban districts. Many wish that the Board was similarly disposed in regard to the raising of excessive loans for local undertakings.

Model Bye-laws.—Under the circumstances to which we have referred, the bye-laws are found to vary according to local requirements, and the views (progressive or otherwise) held by the different authorities. For the guidance of Urban District and Borough Councils, a series of Model Bye-laws have been issued by the L.G.B., and which have been extensively adopted, each authority making such modifications as seemed necessary to meet the special requirements of its own particular locality. The Local Authorities have also been assisted by various Public Health Amendment Acts, known as the 'Adoptive' Acts, of which the more important are the Amendment Act of 1890, the Private Street Works Act, 1892, and the Amendment Act of 1907.

New Streets.—The laying out and formation of new streets are regulated by the L.A. under sec. 157 of the Public Health Act, 1875, which provides that every Urban Authority may make bye-laws 'with respect to the level, width, and construction of new streets, and the provision for the sewerage thereof.' In order to understand the practical effect of the provisions of the enactment referred to, regard should be had to the following definitions :—

Definition of 'Street.'—The term 'street' includes 'any highway (not being a turnpike road), and any public bridge (not being a county bridge), and any road, lane, footway, square, court, alley or passage, whether a thoroughfare or not.' It is necessary that there should be houses on both sides of a thoroughfare in order to make it a 'street' (*Richards* v. *Kessick*).

Definition of 'Sewer.'—'Sewer' includes sewers and drains of every description, except drains to which the word 'drain' as hereafter interpreted applies, and except drains vested in or under the control of any authority having the management of roads and not being a Local Authority (such as a County Council) under this Act.

Definition of 'Drain.'—'Drain' means 'any drain of and used for the drainage of one building only, or for premises within the same curtilage, and made merely for the purpose of communicating therefrom with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings occupied by different persons is conveyed.'

As defined in this case, a 'drain' means a conduit that receives the drainage of one house only, but from the first junction with a drain from a second house not within the same curtilage it becomes a sewer (*Vestry of St. Martin* v. *Bird*).

Further light is indirectly thrown upon these definitions by sec. 19 of the Public Health Act, 1890, which reads as follows :—

> Where two or more houses belonging to different owners are connected with a public sewer by a single private drain, an application may be made under sec. 41 of the Public Health Act, 1875 (relating to complaints as to nuisances from drains), and the Local Authority may recover any expenses incurred by them in executing any works under the powers conferred on them by that section from the owners of the houses, in such shares and proportions as shall be settled by their surveyor, or (in case of a dispute) by a Court of Summary Jurisdiction.
>
> For the purposes of this section, the expression 'drain' includes a drain used for the drainage of more than one building.

Application to Authorities.—The Model Bye-laws provide that :—

> Every person who shall intend to lay out a street shall give to the Sanitary Authority notice in writing of such intention, which shall be delivered or sent to their clerk, at his or their office, or to their Surveyor at his or their office, and shall at the same time deliver or send, or cause to be delivered or sent, to their clerk, at his or their office, or to their Surveyor, at his or their office, a plan and sections of such intended street, drawn to a scale of not less than *one inch* to every *forty-four feet.*
>
> Such person shall show on every such plan the names of the owners of the land through or over which such street shall be intended to pass, the intended level and width, the points of the compass, the intended mode of construction, the intended name of such street, and its intended position in relation to the streets nearest thereto, the size and number of the intended building lots, and the intended sites, height, class, and nature of the buildings to be erected therein, and the intended height of the division and fence walls thereon, and the name and address of the person intending to lay out such street.
>
> Such person shall sign such plan, or cause the same to be signed by his duly authorised agent.
>
> Such person shall show on every such section the levels of the present surface of the ground above some known datum, the intended level and rate or rates of inclination of the intended street, the level and inclinations of the streets with which it is intended that such street shall be connected, and the intended level of the lowest floors of the intended buildings (sec. 91).

Arrangements with Authorities.—The Urban Authority may agree with any person for the making, at his own expense, of roads for public use through any land belonging to him situated within their district, and may agree that such roads shall become on application highways maintainable and repairable by the inhabitants at large within their district. The Authority may also, with the consent of two-thirds of their number, agree with such person to pay any portion of the expense of making such roads (sec. 146). An Urban Authority may also by agreement with any person liable to repair any street or road or any part thereof, take upon themselves the maintenance, repair, cleansing, or watering of any such street or road, or any part of it (sec. 148). It will be observed that the term used in sec. 146 is ‘roads’ and not ‘streets,’ and the section is therefore applicable to private ‘roads’ only.

Plans of New Streets.—From the singularly interesting report on the existing regulations relating to streets and buildings in various towns in England, prepared by the Town Clerk of Leicester for the Association of Municipal Engineers, it appears that with the exception of one or two small towns, e.g. Wenlock and Great Torrington, every owner of land must conform to certain local regulations or bye-laws before he commences to lay out a new street. In the majority of places the stipulations are contained in bye-laws sanctioned by the L.G.B. Usually plans in duplicate and sections not exceeding four in number, and prepared to a prescribed scale, must be deposited with the Corporation for approval before any new street is laid out. Generally the plan must show the names of the owners of the land through which the street will pass, the points of the compass, and the size and number of the intended building plots. Information must also be given as to gradients, levels, &c., and nearly always the position of the street relatively to existing streets must be disclosed. In some cases, e.g. West Hartlepool and Sunderland, the height, class and nature of the buildings to be erected, and the proposed height of the division and fence walls must be stated.

In many towns the plan, when approved, remains good for an indefinite period, but generally a time limit is in force which varies from six months in Workington, and twelve months in Barrow-in-Furness, West Ham, and Wakefield, to five years in Southport. In Manchester and Birmingham the time is two years. In Halifax if the street is not laid out for public use within four years the plan is void. The period mentioned in sec. 15 of the Public Health Acts Amendment (Adoptive) Act, 1907, is three years, and which also provides that the L.A. may retain any plans or other documents deposited with and approved by them.

Estate Plans.—In no place does an owner appear to be under an obligation to furnish for approval a plan of the method in which he proposes to lay out a building estate, or even when he submits a plan of a single street is he obliged to show on the plan its position in relation to any projected street on his estate, or in the neighbourhood.

The Town Clerk of St. Helens states that although there is no special provision in the Acts or bye-laws of the borough for regulating building estates, ' in practice a plan of the whole estate showing the intended streets and levels is insisted on.'

Power to vary Street Plans.—It is worthy of note that in most towns there is no power to alter or vary the direction or position of the streets shown on plan. Some Corporations have, however, acquired exceptional powers. In Nottingham the Corporation have full power, subject to a compensation clause, and the Leeds Corporation acquired similar power under the Leeds Corporation (Consolidation) Act, 1905. In

Bournemouth there is a similar power subject to compensation, but there is no power to compel the communication of the streets on one estate with those on another. Bradford and Brighton have certain discretions, and also Blackburn, 'to a limited extent.' In Leicester, by the Leicester Improvement Act, 1881, it is provided that 'the Corporation may at any time after a plan for a new street has been deposited, and before the same has been sanctioned, vary or alter the intended position or direction of such intended new street, for the purpose of securing more easy and convenient communication with any other street adjoining or leading thereto, or for the purpose of making such new street communicate therewith at a more convenient level.' A similar provision is contained in the Barrow-in-Furness Act, 1875, sec. 49, and in the Huddersfield Improvement Act, 1871. By virtue of the Ealing Corporation Act, 1905, Ealing possesses like powers, but subject to the payment of compensation to any person injuriously affected. In Liverpool under the Corporation Act, 1902, there is power to alter or vary both the position or direction of a new street shown on a plan, but compensation is payable to the person depositing the plan. St. Helens and Bolton possess somewhat similar powers. Under the Public Health Acts Amendment (Adoptive) Act, 1907, the L.A. may vary the position or direction, and fix the beginning and end of new streets, subject to paying compensation to any person who may be injuriously affected by the exercise of such power.

Level and Width of New Streets.—The Model Byelaws provide that a new street shall be laid out at such level as will afford the easiest practicable gradients throughout the entire length of such street for the purpose of securing easy and convenient means of communication with any other existing or intended street with which it may be connected, and as will allow of compliance with the provisions of any statute or bye-law in force within the district.

In regard to width, every principal street that exceeds 100 feet in length shall be constructed for use as a carriage road, and must have a minimum width of 36 feet. Where less than 100 feet in length, the minimum width shall be 24 feet.

For streets intended for use as a secondary means of access, the width is to be 16 feet, unless the length shall not exceed 100 yards, in which case it shall be at least 13 feet in width. In the case of *Waite* v. *Garston Local Board* the bye-law was held to be *ultra vires*, which required that no dwelling-house should be erected without having at the rear or side a roadway not less than 12 feet in width communicating with an adjoining highway, and in such position as the Local Authority approved, for the purpose of affording efficient means of access to the privy or ashpit belonging to such dwelling.

Any person constructing a new street that is intended for use as a carriage road, and to form the principal approach or means of access to any building, shall comply with the following requirements :—

(*a*) He shall construct the carriage-way of such street so that the width thereof shall be *twenty-four feet* at the least.

(*b*) He shall construct the surface of the carriage-way of such street so as to curve or fall from the centre or crown of such carriage-way to the channels at the sides thereof; the height of the crown of such carriage-way above the level of the side channels being calculated at the rate of not less than *three-eighths of an inch* and not more than *three-fourths of an inch* for every *foot* of the width of such carriage-way.

(*c*) He shall construct on each side of such street a footway of a width not less than *one-sixth* of the entire width of such street.

(*d*) He shall construct each footway in such street so as to slope or fall towards the kerb or outer edge at the rate of *one half of an inch* in every *foot* of width, if the footway be not paved, flagged, or asphalted, and at the rate of not less than a *quarter of an inch* and not more than *one half of an inch* in every *foot* of width, if the footway be paved, flagged, or asphalted.

(*e*) He shall construct each footway in such street so that the height of the kerb or outer edge of such footway above the channel of the carriage-way (except in the case of crossings paved or otherwise formed for the use of foot passengers) shall be not less than *three inches* at the highest part of such channel, and not more than *seven inches* at the lowest part of such channel (sec. 7).

Time of Construction.—In regard to the time of construction, it was held in *Baker* v. *Portsmouth L.A.* that a bye-law which required that no building should be erected until the street had been constructed to the approval of the L.A. was considered good by the Court of Appeal. On the other hand, it has been held that a bye-law requiring that no person shall commence the erection of a building in a new street unless and until the kerb of each footpath therein shall have been put in pursuant to the preceding requirements, was held to be unreasonable, chiefly on the ground that the liability was not limited to the frontage of each building.

Varying Widths.—Provision is also made that the entrance to a new street shall be of a width equal to the width of the street, thus being free from projections or obstructions of any kind (sec. 8).

The requirements of different towns as to the width of the carriage-ways and footways vary considerably. Generally, the streets are divided into classes and the width of the carriage-way depends on the class of street, and footpaths are required on both sides of the street. In sixty-three towns, 24 feet is the required width for a carriage-way, with a footpath 6 feet wide on each side. In Birkenhead, Sunderland, and Salford, three-fifths of the entire width of the street must be devoted to the carriage-way and two-fifths to the footways. In Leeds the proportions are two-thirds and one-third respectively; while in Bolton and Ipswich the Corporation may determine the width of the carriage-way and footpath in each case, and a similar power is possessed by the Corporations of Stockton-on-Tees and Wakefield. The classification of streets adopted in Barrow-in-Furness is as follows: (*a*) Main thoroughfare (first class), 80 feet wide with 40 feet carriage-way and 20 feet footpaths; (*b*) main carriage road (second class), 60 feet wide with 36 feet carriage-way and 12 feet wide footpaths; (*c*) subsidiary front streets (third class), 40 feet wide with 25 feet carriage-way and 7 ft. 6 in. footpaths; (*d*) a back street 20 feet wide must be constructed at the rear of a continuous line of dwellings unless the Corporation otherwise allow. This classification is sanctioned by the Barrow-in-Furness Act, 1875, sec. 42, and in the same Act (sec. 44) it is provided that the Corporation may, at their discretion, reduce the width of the street in front of the houses, or if the street is not the principal or only approach to dwelling-houses.

It is only in a comparatively limited number of towns that the Corporation have any discretionary power to vary the width of any street, the width being generally fixed by the regulation. In Nottingham the streets must be laid out at such width as the Corporation shall determine, while in Leicester every new street must be laid out and formed at least 30 feet wide, unless the sanction of the Corporation is first obtained to a reduction of this standard width. In Birmingham the Corporation may allow a reduction in the width of the street if the buildings are set back from the street-line. In Bacup the streets have to be 'of such width and at such level as the Corporation shall in each case determine.' The same regulation is also applicable in Bolton and Huddersfield; while in Sunderland there is power to increase the width to 50 feet if the street will be a leading thoroughfare, and to 60 feet if the buildings in it will exceed 27 feet in height; but the Corporation must bear the cost of the pavement of the increased width.

Methods of Construction.—The materials and character of construction of the roads also vary considerably with the class of road and the situation of the town. In Barrow a main thoroughfare or first-class road must have a slag foundation 12 in. thick, with 4 in. ordinary macadam of first-class stone, or 4 in. of tarred macadam at the discretion of the Corporation. A main carriage road or second-class road only requires a foundation of 9 in. thick, and a third-class road is made up of 7 in. slag foundation and 4 in. tarred limestone macadam. The footpaths must in each case be flagged, but the flags vary in each case from 3 in. thick to 2 in. In Exeter tar paving is allowed for the footways, and in Bournemouth 3 in. deep of gravel.

In the majority of towns, streets are required to be paved with stone setts, and be provided with flagged footways, but often plans are passed for a street which, however, will not be taken over by the Corporation as a highway repairable by the inhabitants at large until considerable further works have been carried out upon it; for instance, in Huddersfield the Corporation generally require a kerb and ash footpath, but at a later stage a flagged footpath may be necessary. Similarly, with regard to the carriage-way, the Corporation, on the approval of the plan, only insist on macadam, but when they exercise their powers under their local Acts, which are analogous to those in sec. 150 of the Public Health Act, 1875, they generally require the street to be paved. In some few places the regulations only deal with the contour of the roads.

Intersecting Streets.—Although not quite the general rule, many Corporations require that a street shall not be laid out for a greater length than from 100 to 300 yards without an intersecting street. Such powers are possessed by the Corporations of Liverpool, Manchester, Leicester, St. Helens, Sheffield, Leeds, and many others.[1]

After having obtained the sanction of the L.A. to the formation of a new street, formal notice in writing must be given to the surveyor of the Sanitary Authority specifying the date on which it is proposed to commence the work of laying out or constructing such street (sec. 93, P. H. Act). During the laying out or construction of the street the surveyor is to be afforded free access to such street for the purpose of inspection. Within a reasonable time after the completion of the laying out or construction of such street formal notice must be sent to the surveyor advising him of such completion, and free access allowed to the street for a

[1] Report to the Association of Municipal Corporations, prepared by the Town Clerk of Leicester.

reasonable period for the purpose of his inspection (sec. 96).

Taking over New Streets.—As already pointed out, under sec. 148 of the Public Health Act, 1875, an Urban Authority may by agreement with any person liable to repair any street or road, or any part thereof take upon themselves the future maintenance and repair of such road. Or, if any street within an urban district (not being repairable by the inhabitants at large) or the roadway, footway, or any part of such street is not sewered, levelled, paved, metalled, flagged, channelled, and made good, or is not lighted to the satisfaction of the Urban Authority, the Authority may by notice, addressed to the respective owners or occupiers of the premises fronting, adjoining, or abutting on such parts of the street as may require to be made good, request them to carry out the necessary work within a specified time. Before giving the notice the Authority is to cause plans and sections of any structural works intended to be executed, and an estimate of the probable cost to be made under the direction of their surveyor, such plans and estimate to be deposited in the office of the Authority for the inspection of all persons interested during the time specified in the notice. If the notice is not complied with the Authority may execute the works and recover the expense from the owners in default according to the frontage of their respective premises, and in such proportion as shall be determined by the surveyor (sec. 150).

The section does not apply if the whole of the street is repairable by the inhabitants at large, but it applies where part of a street is so repairable and part is not, as in the case where a highway has been enlarged by means of a strip of land in front of the houses having been thrown into the highway, the strip so added is a street within the meaning of the section, and the frontagers to such strip may be called on to pave, channel, and otherwise make it good (*Richards* v. *Kessick*, 57 L.I.M.C. 48).

Although the notice must be served on the owners or occupiers, the cost of the works, if done by the Authority, falls on the owner of the premises, i.e. the person for the time being receiving the rack-rent of the premises, or who would be entitled to receive the same if such land or premises were let at a rack-rent. When there is a change of ownership after the notice has been served, it is the person who is owner at the time of the completion of the works that is liable for the cost (*Bettesworth* v. *Riches*, 37 Ch. D. 535).

It is worthy of note that in the seemingly comprehensive wording of the above section no provision is made for ‘ kerbing.’

Private Street Works Act, 1892.—Since the passing of this Act the making up of ‘ private streets ’ has been more generally carried out under its provisions than under those of the older measure. It is, however, what is known as a permissive Act, and may or may not be adopted by an Urban Authority. Where adopted it is to be considered as one with the Public Health Acts, and as applying only to England. It amends, and in many ways improves, the mode of procedure laid down in the 1875 Act. The omission of ‘ kerbing,’ and the redundant words ‘ paving, metalling, and flagging,’ which were so confusing in the 1875 Act, are here defined to include ‘ macadamising, asphalting, gravelling, kerbing, and every method of making a carriage-way or footway.’ The mode of procedure is somewhat similar, though much more comprehensive, than that of the Act of 1875; when a street (not repairable by the inhabitants at large) is not sewered, levelled, paved, &c., to their satisfaction, the Authority may resolve to do what is necessary without giving the owners the option of doing the work themselves, and in such resolution may include several streets, or parts of streets, or may be limited to any part or parts of a street. Upon this resolution the surveyor must prepare, (*a*) a specification of the necessary works with plans and sections; (*b*) an estimate of the probable expenses; (*c*) a provisional apportionment of the estimated expenses among the premises liable to be charged. These have to be submitted to the L.A., and the resolution approving them has to be published in manner provided by the Act. Copies are to be served on the owners of the premises affected within seven days from the date of the first publication, and the approved specification, plans, estimate, and provisional apportionment are to be kept deposited at the offices of the Authority, and be open to inspection at all reasonable hours. The owners may at any time during one month object to the proposals of the Authority, in which case the objections are to be determined by a Court of Summary Jurisdiction (sec. 8).

Sec. 9 provides for the inclusion of any incidental work necessary for bringing the street into conformity with any other streets as regards sewerage, drainage, level or other matters, including the provision of separate sewers for the reception of sewage, and of surface water respectively; and the inclusion of a charge, not exceeding five per cent., in respect of the survey, &c.

Whenever all or any of the works mentioned in the

Act have been executed in a street or part of a street, and the L.A. are of opinion that such street or part of a street ought to become a highway repairable by the inhabitants at large, they may by notice to be fixed up in such street declare the whole of the street to be a highway repairable by the inhabitants at large, and thereupon the street shall become a highway (sec. 19). Under this section the owners of the street are deprived of the power which they hold under the Public Health Act, 1875, of objecting to the street being made a public highway.

If any new street is completed to the satisfaction of the L.A., then on the application in writing of the greater part in value of the owners of the houses and land in such street, the Authority shall, within three months from the time of such application, by notice to be put up in the street, declare it to be a highway repairable by the inhabitants at large, and thereupon such street shall become a highway so repairable (sec. 2).

Apportionment of Expenses.—In apportioning the expenses the L.A. are not obliged to base such apportionments upon frontage alone, as provided under the Public Health Act, 1875, but may if they think fit have regard to the greater or less degree of benefit derived by any premises from the proposed works, and to the amount and value of any work already done by any of the owners, and may also include premises which do not abut, &c., on the street, but access to which is obtained from the street through a court or passage (sec. 10).

Recovery of Expenses.—Expenses incurred for private street works under the Act of 1892, including interest from the date of final apportionment, are recoverable by action in the County Court, although amounting to £50 or more; and the six months' limitation is apparently not applicable to an action in the County Court as it is under sec. 261 of the Public Health Act, 1875. Expenses are also recoverable in the High Court of Justice, in a Court of Summary Jurisdiction, or as charges on the premises (sec. 14).

Under the 1907 P. H. A. (Adoptive) Act the L.A. may, after serving notices on the frontagers, carry out any urgent repairs to private streets, and recover summarily as a civil debt the cost of such repairs from each owner in proportion to the extent of his premises fronting, adjoining, or abutting on such streets.

Churches, Chapels, &c.—The incumbent, minister, or trustee of any church, chapel, or place appropriated to public religious worship, which is for the time being exempt from rates for the relief of the poor, is not liable to any expenses of public street works, nor are any such expenses to be deemed a charge on such properties, or to subject the same to distress, execution, or other legal process, but the proportion of expenses in respect of which an exemption is allowed is to be borne and paid by the L.A. (sec. 16).

Air Space.—Among other matters covered by byelaws is the provision of a sufficient space about buildings to secure a free circulation of air. This is done by specifying the minimum open space that shall be provided in front of each domestic building, and the superficial area of air space to be allowed in the rear of such building. In regard to the latter the Model Byelaws provide that the distance shall in no case be less than 10 feet; if the building be 15 feet in height, the minimum distance to be 15 feet; if 25 feet in height, the minimum distance to be 20 feet; and if the building be 35 feet or more, the distance to be 25 feet at least; the total space being not less than 150 square feet (see Fig. 1).

The open space to be provided in front of the houses is often fixed at a minimum distance of 24 feet measured to the boundary of any lands or premises immediately opposite, or to the opposite side of any street which such building may front.

In practice the requirements as to air space at the rear or side of dwellings are found to vary from a minimum area of 100 square feet in Bacup to 500 square feet in Croydon. In the majority of towns, however, the minimum area required is 150 square feet as provided in the Model Bye-laws. As notable exceptions may be mentioned Newark, with 400 square feet; Coventry, 300 square feet; Cheltenham and Ealing, 200 square feet; and Blackburn with 180 square feet.

The depth of open space required at the rear or side of dwellings varies in proportion to the height of the buildings, and is generally from 10 to 30 feet.

Building Line.—Under sec. 3 of the Public Health (Buildings in Streets) Act, 1888, it is not lawful to erect or bring forward beyond the front main wall of the house on either side thereof, any house or building in any street situated in an urban district without first having obtained the written consent of the L.A. If there are no buildings on sites abutting on a street there is no building line, and he who first builds in that street may erect buildings up to the boundary of his frontage. Where there is a building on one side it controls the front line of a new building; but in all cases the buildings which affect the building line must be in the same street within the meaning of the Act.

Buildings on sites at the corners of intersecting streets abut on two streets, so may have to conform to two building lines : or they may abut on two streets, one at the back of the premises and one in the front. Where a side road will have a building line set back from the road, it is advisable to get the corner houses facing the main road built first, so as to avoid having to set the flanks back where such is not desired. Disapprovals should be fairly warranted by the facts as the L.A. are not invested with a general discretion to be exercised according to their own good wisdom, but with a legal discretion, i.e. to discern what is just according to law.

Among other places where special discretionary powers are possessed may be mentioned Birmingham, Liverpool, Nottingham, Bournemouth, Folkestone, Leeds, Huddersfield, Bolton, and St. Helens, but the exercise of such powers is invariably subject to the payment of compensation.

Sewers.—Under the Public Health Act, 1875, all existing and future sewers within the district of a L.A. become vested in and under the control of such Authority, except sewers made by any person for his own profit, or for the improvement of land, or those under the authority of any Commissioners of Sewers appointed by the Crown. Sewers laid by an owner for the purpose of building development become vested in the L.A. as soon as completed (*Ferrand* v. *Hallas Land and Building Co.* (1893), 2 Q.B. 135). EVERY L.A. IS LIABLE to keep in repair all sewers belonging to them (sec. 15), and shall cause such sewers to be constructed, covered, ventilated, and kept so as not to be a nuisance or injurious to health, and to be properly cleansed and emptied (sec. 19). Every L.A. shall also cause to be made such sewers as may be necessary for effectually draining their district (sec. 15). The sewers provided by a L.A. must be sufficient to carry off the ordinary sewage and rainfall of the district, but they need not be sufficient to carry off an extraordinary flow of water caused by a storm (*Brown* v. *Sargent*, 1 F. & F. 112).

A L.A. may carry any sewer through, across, or under any turnpike road, or any street or place laid out as, or intended for, a street, or under any cellar or vault which may be under the pavement or carriageways of any street and, after giving reasonable notice in writing to the owner or occupier, into, through, or under any lands whatsoever within their district; they may also, subject to certain limitations, exercise all or any of these powers outside their own district for the purpose of outfall or distribution of sewage (sec. 16).

Powers of Authorities.—The L.A. may from time to time enlarge, lessen, or alter the course of, cover in or otherwise improve any sewer belonging to them, and may discontinue, close up, or destroy any such sewer that has in their opinion become unnecessary, on condition of providing a sewer as effectual for the use of any person who may be so deprived of the lawful use of any sewer. Provided that the discontinuance, closing up, or destruction of any sewer shall be so done as not to create a nuisance (sec. 18).

If a new street situate within an urban district (not being a highway repairable by the inhabitants at large) is not sewered to the satisfaction of the L.A., the Authority may, if the Private Street Works Act, 1892, has been adopted, resolve to sewer such street or part of the street and, after following the procedure laid down in the Act, may recover the expenses from the owners of premises fronting such street (sec. 6). It is worthy of note that the Public Health Act, 1875, authorises the L.A. to make bye-laws containing 'provisions for the sewerage' of new streets, but in the Model Bye-laws of the L.G.B. no provision is made for such sewerage. The circumstances which led to this omission are explained in the following extract from a circular-letter of the L.G.B. dated July 25, 1877 :—'It will be seen that the model series contains no bye-laws specifying provision for the sewerage of new streets; and the reason for this is that the conditions which such bye-laws must satisfy are to so great an extent dependent upon the varying circumstances of different localities. The Board do not anticipate that inconvenience will result from the absence of satisfactory bye-laws with respect to sewerage, for it may be doubted whether any powers which under such bye-laws may be lawfully assumed by sanitary authorities will, as regards extent and efficacy, compare with the powers which they derive from the express provisions of the Public Health Act.'

Plan of Sewers.—Under the provisions of the Public Health Acts the L.A. is responsible for preparing a map of their sewers and sanitary works, and for such map to be kept at their office and be open at all reasonable hours to the inspection of the ratepayers of the district.

Owners' Rights of Drainage.—The owner or occupier of any premises within the district of a L.A. is entitled to cause his drains to empty into the sewers of that authority on condition of his giving the necessary notice, and of complying with the regulations of the Authority in respect of the mode in which the connections between such drains and sewers are to be made, and subject to the control of any person who may be appointed by the Authority to superintend the making of such connections (sec. 21).

The L.A. may enforce drainage of undrained houses and connection of same to any sewer within 100 feet (sec. 23), and any person erecting a house without drains in an urban district renders himself liable to a penalty of £50 (sec. 25). No person is allowed to erect a building over any sewer of the L.A. without first having obtained the written consent of such Authority (sec. 26).

CHAPTER V

PRACTICAL DEVELOPMENT PROCEDURE

Preparation of Plan.—In dealing with the sections of an estate that have become ripe for building, the first step will be the preparation of an accurate plan. This should be drawn to a scale of 44 feet to the inch, in order that tracings may be taken direct from it to meet the requirements of the Local Authorities. The preparation of this plan will call for the application of much care and skill, as it will form the basis of the numerous subdivisions into plots that will probably follow, with the detailed plans necessary for sales as well as for lettings. Upon the plan should be shown full details of existing structures, fences, ditches, water-courses and other features, so that it may form a reliable record of the actual physical condition of the estate prior to its development. It is also desirable to show the position of any adjacent streets or buildings that are likely to affect the undertaking.

Staking out and Levelling.—Having prepared this large scale plan, and plotted the lines of the various proposed roads with the assistance of the contour plan, as already suggested, such lines should be staked out on the ground. It is well to have one line of stakes in the centre of each roadway, and a similar line of stakes marking the extreme width on each side, to facilitate the subsequent levelling for the longitudinal sections and cross-sections. The levels should commence from an Ordnance bench-mark, the height of which is known, and be continued along the central section line at every chain length, or at each appreciable change in the surface configuration. The levels necessary to show the surface of the land at points right and left of the central section line are usually taken. These points, which are taken at right angles to the central section line, may with advantage be determined when the side stakes are also driven into the ground. If these stakes are numbered, the levels may be recorded as applicable to the cross-sections, left or right, corresponding with the numbers on the side stakes.

The sections and cross-sections may then be plotted, the horizontal scale being generally the same as that of the plan, but the vertical measurements are laid down to a larger scale, that most frequently adopted being 10 feet to the inch, as indicated in the reduced sections forming Fig. 20.

Lines of Roadway.—The next step will be the fixing of the formation line of each roadway. Where the surface of the land is nearly level, or forms an even slope, the expenditure may be reduced to a minimum by allowing the formation line to follow that of the surface. In this country, however, it is seldom that the surface configuration will permit of any appreciable length of road being made in that way. The laying down of the formation line, therefore, involves a very careful consideration of the relative advantages and disadvantages of curves, cuttings, and embankments, with a view of ascertaining the most economical method of dealing with surface irregularities in order to secure the easiest practicable gradients. In this connection it is well to bear in mind that if the houses which are to be built will stand well back from the road, the finished surface of the latter can be either proportionately above or below the ground-level without appreciably adding to the cost of the buildings.

Cuttings and Embankments.—With a view to economy, the longitudinal inclinations of a road should be laid down with a minimum of cutting and embanking. Theoretically, where a road has to be carried over a high elevation, it should be so laid out that it should not have any fall until it reaches the summit. When a road runs along the side of a hill, the transverse section line should be so arranged that what is taken from the upper side should serve to form the embankment on the lower side. The adjustments of heights and hollows should be so arranged as to secure gradual and continuous ascending inclinations to the highest point.

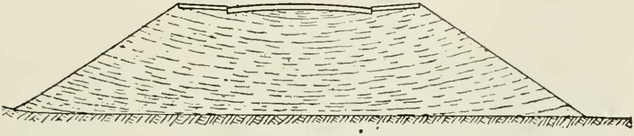

FIG. 3.

For the purpose of ascertaining the nature of the soil and subsoil in excavations of any appreciable depth, trial-holes should be sunk at intervals of about 200 yards, as the slopes of the sides of cuttings and embankments will have to be arranged according to the character of these soils. Embankments should be formed by laying the earth on in concave courses, in order to impart firmness and stability to the work. The outsides should, therefore, be formed first and the filling gradually worked towards the centre (see Fig. 3).

The slopes at which cuttings and embankments can be safely made depend upon the nature of the soils, and are somewhat as follows :—

Kind of soil.	Maximum slope.	Angle with horizon.
London Clay ..	3 to 1	18° 26′
Chalk	$1\frac{1}{2}$ to 1	33° 42′
Sandstone	$\frac{1}{2}$ to 1	63° 26′
Limestone strata ..	$\frac{1}{2}$ to 1	63° 26′
Gravel	$1\frac{1}{4}$ to 1	38° 40′

The amount of subsidence in newly made embankments depends upon the class of soil of which they are formed, the settlement usually varying from one-twelfth for gravelly soil or very stiff clay, to one-fifth for the more friable clay loams. For purposes of economy the line of formation level of all proposed work should be so adjusted that the earth derived from the cuttings shall be equal to that necessary for the embankments, otherwise additional expense will have to be incurred in disposing of the surplus in 'spoil banks,' or of obtaining the additional earth required by 'side cuttings.' The quantities of earthwork may be calculated by the following prismoidal formula :—

$$\frac{[\text{Sum of areas of both ends} + (\text{middle area} \times 4)] \times \text{length.}}{6}$$

or more expeditiously by the use of Earthwork Tables such as those compiled by Sir John Macneill.[1]

In calculating the solid contents, allowance should be made for the difference in bulk between the different kinds of earth when occupying their natural bed, and when made into embankment. From careful experiments made by Mr. Elwood Morris he found that light sandy earth occupied the same space in excavation and embankment; clay soil about one-tenth less in embankment than in its natural bed; gravelly earth about one-twelfth less; rock in large fragments about five-twelfths more. Judging from our own experience in excavations for roadmaking, we find the increase in bulk of different soils before settlement to be approximately as follows:—

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[1] 'Tables for calculating the cubic quantity of earthwork in cuttings and embankments of canals, railways, and turnpike roads.'

Kind of soil.	In situ.	Excavated and before settlement.
Clay loam	1	$1\frac{1}{3}$ to $1\frac{1}{2}$
Sand	1	$1\frac{1}{9}$ to $1\frac{1}{4}$
Gravel	1	$1\frac{1}{7}$ to $1\frac{1}{4}$
Clay	1	$1\frac{2}{3}$ to $2\frac{1}{3}$
Chalk	1	$1\frac{7}{8}$ to $2\frac{1}{4}$

Gradients.—Although agreed as to the desirability of fixing a rate of inclination that should not be exceeded, engineers, nevertheless, differ widely as to what that *ruling* or maximum gradient should be. It is difficult to lay down any hard-and-fast rule as to the maximum steepness of slope that is permissible in a road, as gradients which would be considered high in a level country would of necessity have to be exceeded in hilly districts. In our own practice in laying out building estates we have occasionally found it necessary to adopt a gradient of 1 in 10, more particularly in connection with short lengths of road in the south-west of England. Steeper gradients than this are, however, to be met with in some towns, as at Blackburn, for instance, where the maximum gradient for macadamised roads is 1 in 6·03, and of paved roads 1 in 6·05.

Notwithstanding such extreme cases, the maximum slope ought not, if possible, to exceed the limiting angle of resistance for the materials forming the road surface, the safe maximum gradient depending upon the nature of the road surface and also upon the force required to propel a given load upon it. The force required to move a ton load, the corresponding limiting angles of resistance, and maximum inclination are given in the following table from Law and Clark's 'Roads and Streets,' the values of the resistance in its compilation being those given by Sir John Macneill :—

Description of roadway.	Force in lbs. required to move one ton.	Limiting angle of resistance.	Maximum inclination to be given.
Well-laid pavement . .	31·4	0° 48′	1 in 71
Broken stone surface on a bottom of rough pavement or concrete	44·0	1° 7½′	1 in 51
Broken stone surface laid on an old flint road	62·0	1° 35′	1 in 36
Gravel road	140·0	3° 35′	1 in 16

The experiments of Parnell and Gayffier show the influence of slopes on the powers of traction of a horse. These results are given in the following table :—

Gradient.	Angle of slope.	Proportionate power.
1 in 100	0° 34′ 23″	·9
1 ,, 50	1° 8′ 6″	·81
1 ,, 40	1° 25′ 57″	·72
1 ,, 30	1° 54′ 37″	·64
1 ,, 26	2° 12′ 2″	·64
1 ,, 20	2° 51′ 21″	·4
1 ,, 10	5° 42′ 48″	·25

From the foregoing it will be seen that on a gradient of 1 in 10, a horse can only draw about one-quarter of his maximum load. In addition, however, to economy in traction power, gradients also affect the cost of maintenance. Steep inclines increase the rate of wear not only on account of the greater abrasive influence of horses' feet, but also from the use of skids or drags on the descent.

For main roads a maximum gradient of 1 in 30 should be adhered to, if possible. A horse will trot easily on a slope of 1 in 30, and for a short distance on a gradient of 1 in 25, but at a greater inclination than this a walking pace only will be generally possible. On the other hand, a perfectly flat road is to be avoided, for if there is not a longitudinal inclination of at least 1 in 100, water will not run off, and the surface, by remaining wet and damp, will wear rapidly away. A gradient, therefore, of from 1 in 100 to 1 in 150 may be taken as the flattest that is desirable, having regard to the drainage and durability of the road.

It is worthy of note that the present practice in France, according to M. Renardier,[1] is, as far as possible, to keep to a gradient of 2·5 per cent. (1 in 40) for national and departmental roads in level country. In hilly parts there are gradients of 5, 6, 8, and even 10 per cent., or 1 in 20, $16\frac{2}{3}$, $12\frac{1}{2}$, and 10 respectively. For secondary roads a gradient of 5 or 6 per cent. (1 in 20, or $16\frac{2}{3}$) is usually the maximum.

In Portugal, which is a hilly country, it is not deemed expedient to make the gradients in the principal roads more than 2 in. per yard, or 1 in 18.

Curves.—A steep gradient may sometimes be considerably modified by a curve crossing the contour lines at an oblique angle. In some cases advantage may be taken of the necessity of forming curved roads by the development of land in oval or circular blocks, the central portion of which may be laid out as private pleasure grounds or gardens. It is desirable, however, in the case of the principal roads on an estate, that the radii of the curves should be as great as possible, but not less than 100 feet. In Germany, wherever possible, the curves of the main roads are not allowed to have a radius of less than 115 to 164 feet; while in Belgium the minimum radius is regarded as 162 feet, in Russia it is from 100 to 130 feet, and in France 100 feet for the principal roads and 66 feet for the secondary roads.

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[1] Report on the International Road Congress, 1908.

It will be observed that a curve is given to the roads running north and south on the Plan shown as Fig. 2. Although adding somewhat to the length of the roads and interfering with the average depth of the plots, the advantages attending its adoption were deemed more than sufficient to counterbalance these drawbacks, having regard more especially to:

(1) its equalisation of the gradient;

(2) the improvement in appearance which it effects by breaking the monotony inseparable from lengthy straight roads; and

(3) the lessening of the risk of damage from the downward rush of surface water during heavy storms.

It also permitted of provision being made for improving the gradient by cutting through the brow of the hill to a depth of several feet.

Street Junctions.—Where an imposing opening is required, the curve at a right-angled junction of a street may be struck with a radius equal to one-half of the entire width of the street; but in ordinary cases the outer edge of the kerb is laid at a radius of 6 to 10 feet, or equal to the width of the footpath.

Camber.—The form of cross-section of a road should allow of rain-water running off the surface easily into the side channels. Opinions differ as to what this lateral fall should be, but at the International Road Congress a resolution to 'have the least camber compatible with the easy running off of rain-water' met with unanimous approval. The cross-section should vary somewhat with the hardness, and with the longitudinal slope of the road, and be from 1 in 20–30 for established level roads made with flints or similar material, to 1 in 36–40 for slopes, and for broken granite from 1 in 25–36 to 1 in 40–50 respectively, from the centre.

The maximum inclination specified in the Model Bye-laws is 1 in 16, and the minimum 1 in 32. These rates, however, apply to new roads, which should be more convex than established roads to allow for the flattening of the crown which is produced by traffic. The rates of camber on the Continent are approximately as follows :—In Germany, 1 in 40 ; Belgium, 1 in 50 for metalled, and 1 in 70 for paved roads ; Austria, 1 in 23–32 for metalled, and 1 in 25–33 for paved roads ; in France, 1 in 50 is the standard camber, although in some cases 1 in 40 is adopted for metalled roads.

Road Plans.—The formation line of the new roads having been determined after a careful consideration of the matters previously referred to, the detailed sections may be completed. The longitudinal section should show a horizontal datum line (Ordnance datum if possible), a line indicating the 'formation level' or bed of the road, and another line representing its 'finished surface.' The longitudinal distances should be figured on the datum line; the heights of the formation level, the surface of ground, and finished surface of road, should be marked on the vertical lines; while the rates of inclination of road, and fall of sewers should also be given between each change of gradient, as indicated in the sections comprised in Fig. 20.

The cross or transverse sections should show, by means of lines and distinctive colouring or etching, the formation level of road and footpaths, the finished surface of the road, and the surface of the ground, which in turn indicate what parts have to be excavated or embanked respectively as indicated in the cross-section, Fig. 4, as well as in the cross-sections comprised in Fig. 20.

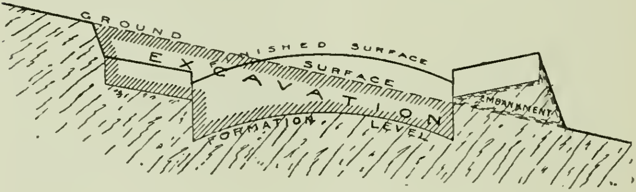


FIG. 4.

It will be observed from the above section that the bed of the road is shaped in the same way as the finished surface. The convexity or camber of the latter would be made in accordance with the local bye-laws or regulations, but in the absence of any specific provision being given therein, we have found the camber given in Fig. 5 (p. 175) sufficient to meet the requirements of gradients varying from 1 to 30 to 1 in 80. The surface of the finished roadway will be seen to form the segment of a circle, the crown being level with the heel of the footpath on each side. The centre of the 30-feet carriage-way is shown to be about 4 inches higher than the top of the kerb, and 9 inches higher than the surface of the channel where it abuts on the kerb. For gradients of less than 1 in 80, the rate of convexity should be proportionately increased.

Plans of Manholes.—In addition to the sections referred to it will be necessary to prepare drawings of the sewer and surface manholes that will be required, as well as of the ventilating columns or shafts and gulleys, the details of which are generally prearranged with the Local Authorities. In many districts the Authorities have their own patterns of manhole covers, ventilating columns, and gulleys, and in such case it will be sufficient to provide that those patterns are to be used.

Notice to Authorities.—The large scale plan, sections, and detail drawings, to which previous reference has been made, having been completed, notice may be sent to the Local Surveyor informing him of the intention to lay out the new streets. The notice should be accompanied by tracings of the plan, sections, and detail drawings, together with a general statement of the intended mode of construction, and of the class of buildings which it is proposed to erect on the property. In some cases where, perhaps, the applicant is unknown to the Authorities, he may be required to define on the plan the proposed building line, and to state the size and number of the building plots, as well as the height of the divisions and fence walls proposed to be erected. After having been examined by the Local Surveyor the plans are submitted to the Highways Committee (if any), or to the Council at their next meeting, and formal notice of approval or disapproval is then sent to the applicant.

Specification and Bill of Quantities.—In the meanwhile, assuming that the work is to be carried out by contract, the owner's surveyor will be able to proceed with the preparation of the specification of works and bill of quantities, as shown in detail hereafter (see p. 259).

With the detail quantities before him the acting surveyor will be in a position to determine with some degree of precision the outlay that will be required to complete the undertaking. If this matter has not been previously arranged, it may be well at this stage for the surveyor to confer with his chief on the subject of the capital expenditure.

Contracts.—The work of formation may be carried out in several different ways, of which the following are those more generally adopted for undertakings of appreciable magnitude :—

(1) Tenders are openly invited for the work by means of advertisements.
(2) Tenders are invited from a limited number of selected contractors.
(3) The work is offered to a contractor at the prices set out in a detailed bill of quantities.
(4) The work is carried out in sections, partly, it may be, by the estate workmen, and the remaining sections by one or more contractors.

In the first-named mode of procedure the work is thrown open to any contractor who is willing to compete for it, and the owner being morally bound to accept the lowest tender may find that the applicant is unable to complete the work unless an extension of time and various other concessions are made to him, or he may endeavour to ‘ scamp ’ the work at every conceivable point. These risks are to a large extent eliminated if the tenders are confined to a limited number of well-known contractors, although the cost may be somewhat in excess of what would be payable in an open competition. The third method is often adopted where a series of roads have to be formed and where the contractor who, either in open or in limited competition, secures and carries out satisfactorily the contract for the first road, is willing to proceed with the formation of the other roads on the same basis of prices. The fourth method is not often adopted as it is somewhat difficult to divide the work into a number of independent sections, in which the responsibility of each contractor can be fixed, without giving rise to much unpleasant friction between the parties.

Inclusion of Quantities.—Whichever method be adopted it is desirable that a formal contract should be prepared and executed. The contract should undoubtedly embody the general specification and conditions, as well as the plans, sections, and detail drawings. The question whether the quantities should form a part of the contract is a matter concerning which surveyors are not agreed. If the quantities are made a part of the contract, the land-owner becomes legally responsible to make good any errors or omissions, but if the quantities are not included in the contract, the contractor has no legal claim in respect of such discrepancies. In the former case the land-owner might have to pay a sum in excess of the tender or of his surveyor’s estimate, and which might, not unreasonably, give rise to friction between the parties ; but in the latter case the contractor would have to bear the loss. Where bills of quantities form a part of the contract, the contractor is, in our opinion, morally entitled to inspect the detailed dimensions, and for this and other reasons the responsibilities of the surveyor are proportionately increased. If, however, the surveyor is a judge of his work, and has been permitted to deal thoroughly with the matter, he will not hesitate to accept such responsibility. If, on the other hand, circumstances have not permitted of the quantities being prepared in the proper way, and only approximate figures are given, such quantities should not form a part of the contract, but provision should be made for the work to be measured up during the progress of the undertaking.

Commencement of Work.—As soon as the preliminary arrangements have been completed, a formal notice should be sent to the contractor to commence the work.

To facilitate matters the owner's surveyor will have some short stakes driven into the ground marking the central line of each proposed road. The lines of the kerbing will also be determined, as it is generally laid before the road-making proper is commenced, in order to serve as an abutment for the carriage-way and footpaths. The different kinds of kerbs, and the methods of laying, are described on p. 208, *post*.

Lines of Sewers.—The lines of the sewers will next be set out, and the depths fixed at different points in order that the necessary excavations may be put in hand, and the sewers laid as more fully described hereafter (see pp. 183–203). Where the size of the building plots can be predetermined, it is an advantage to lay the necessary junctions (usually 6 inches), to receive the house drains, at the same time that the sewer pipes are laid, but where the size of the plots is liable to be varied, the provision cannot well be made. When the several lengths of the sewers have been laid and tested, the pipes should be carefully packed underneath, and covered with about 12 inches of fine dry soil. Each length should then be filled by means of 9-inch layers of soil, each layer being properly rammed, and, if necessary, consolidated by the application of water, until the trench is brought up to the height of the road surface. The laying of the gulley junctions, and the construction of the manholes, will also proceed simultaneously with the laying of the sewers.

Gas and Water Mains.—If the development of the property is likely to proceed rapidly, it may be well to arrange for the gas and water mains to be laid before the road-bed is formed, as under such an arrangement the necessity of breaking up the road after formation is avoided. This method is, however, apt to delay the work of the road formation, and water companies are not, as a rule, disposed to incur the expense of laying their mains unless the land-owner is willing to guarantee the payment to them of an annual charge that is somewhat proportionate to the interest on the outlay required, until the water rates on the new houses are sufficient to reimburse the water companies. The mains should be laid at least 2 ft. 6 in. below the level of the finished surface of the road.

Formation of Road.—As soon as the sewers have been laid, the work of forming the road-bed may be put in hand, the formation levels having been previously determined by the owner's surveyor. After the necessary excavations and embankments have been made, and the road-bed consolidated by rolling, the hardcore will be spread in layers and rolled, in accordance with the specification. The upper layers of metal will then be applied with the necessary rolling in each case. The channelling setts may then be laid and grouted, and the setts or cubes are also laid round the manhole covers, and sides of gulleys.

Payments to Contractor.—Payments on account are made to the contractor as the work proceeds, at the rate of 75 to 80 per cent. of the value of the work executed, as certified by the owner's surveyor, but such payments are not generally made oftener than once a month. The balance of 20 to 25 per cent. is usually retained by the employer, and paid in two equal instalments, one moiety at the end of three months, and the balance at the end of six months after the completion of the work, and upon production of the surveyor's certificates.

Extras.—In addition to the original amount of the contract, there is sometimes a rather considerable sum to be paid for 'extras.' Every care should, however, be taken to avoid this, as such additional payments tend to upset financial arrangements, and clients' tempers. It is, of course, impossible to provide for every contingency in an undertaking of this kind that is of any magnitude, and especially as some contractors seem to be gifted with a superhuman power for creating difficulties in that direction. Still, with care and the exercise of the powers of foresight that are born of experience, these extras may be reduced to a minimum. For the purpose of facilitating financial arrangements it is well to make provision in the bill of quantities for a moderate round sum to be included in the amount of the tender, to cover any extra work that may have to be carried out, and if the whole of such sum is not required, it will prove a welcome surprise to the employer to find that the balance which he has to pay at the completion of the work is somewhat less than he expected. This arrangement assumes that provision will be made in the specification that any portion of the sum provided for contingencies which may not be required, will be deducted from the amount payable to the contractor.

Disposal of Building Frontages.—As soon as the road formation has been completed, arrangements may be made for the disposal of the adjoining land, either by letting it in blocks to builders, by selling such blocks or sites outright, or by the land-owner having the houses built by his own staff of workmen, or by contract. These different methods have already been fully described (see p. 85).

Making-up of Roads.—When the land fronting the new roads, or an appreciable part of it, has been covered with houses, applications are generally made by the occupiers for the footpaths to be paved and the roads made up, either by the owner of the estate or by the Local Authorities, as up to this point the new thoroughfares will have remained technically ‘private streets,’ or ‘private roads.’

The work of finally making up the roads and paving the footpaths is generally carried out by the Local Authorities, either under a comprehensive arrangement with the estate-owner, who undertakes to discharge the whole of the expenses where the plots have been sold or let free from such frontage charges, or where he has undertaken to pay all charges in excess of a certain price per foot frontage. Or, under the powers conferred upon them by section 150 of the Public Health Act, 1875, or by the Private Street

Works Act, 1892, the cost in this latter case being apportioned on the abutting owners in the manner already described (see p. 136). The Local Authority may then declare, either the whole, or such parts of the thoroughfare as have been made up, to be a highway repairable by the inhabitants at large, and henceforth its maintenance is undertaken by the Authority.

In some districts the roads may be made right up at the time of formation and taken over by the Local Authority. Under such an arrangement the roads are kept in order, and the occupiers of houses have the advantage of clean footpaths in all weathers. The making up, however, entails a rather considerable additional expenditure, and this method is therefore seldom adopted except where it is certain that the plots will be taken up quickly.

CHAPTER VI

ROAD MATERIALS

Selection of Materials.—For the purpose of estate development macadam is usually adopted in the formation of new streets or roads. In making a selection of the most suitable materials for the carriage-way of a macadamised road, regard must be had in the first instance to the question of cost. The outlay is generally reduced to a minimum when local materials are employed, although when an inferior stone is used the extra cost of maintenance will probably exceed the difference in first cost of a better material even if it has to be brought from a somewhat considerable distance. In some cases it may be possible to utilise local material in conjunction with that obtained from an outside source, in which case the special qualities of the two products will call for very careful consideration. As a rule it is not advisable to mix a hard material with a soft stone, as such combination is very liable to produce a rough and uneven surface. It is better to put on the two kinds of material separately in layers, and for the harder stone to be kept on the top.

On the other hand, it has been found that certain kinds of material wear much better if combined than if placed in separate layers. This is the case in regard to Kentish rag when used in conjunction with flints, in the proportion of two parts of ragstone to one of flints.

Kinds of Road Material.—Road material of a kind is obtainable from practically all the stratified as well as the igneous rocks comprised in the various geological formations of the United Kingdom, as will be seen from the following summarised statement, which gives the different kinds of road material that may be generally found in the several deposits :—

STRATIFIED ROCKS.

Quaternary Period.

Post glacial or recent.—Shingle, beach flints, and gravel.
Glacial.—Drift boulders and gravel.

Tertiary Period.

Pliocene, Miocene, Oligocene, and Eocene.—Some limestones, grey wether sandstones, conglomerates, and gravel.

Secondary Period.

Cretaceous.—Limestone, chalk pits, Kentish ragstone, ironstone and chert, pebble and flint gravels.
Oolites.—Portland stone, marble, limestone, freestone, coarse flagstones.
Lias.—Marlstone, ironstone.
Trias.—Sandstone, flagstone.

Primary Period.

Permian.—Sandstone, magnesian limestone.
Carboniferous.—Limestone, blackband ironstone, sandstone, chert, whinstone.
Devonian.—Flagstones, sandstone, limestone, granite.
Silurian.—Tilestones, limestone, grits, felstone.

Cambrian.—Slates, flagstones, grits.
Archœan.—Crystalline indurated building stone.

IGNEOUS ROCKS.

These yield building stone, whinstone, paving blocks, and granite.

Qualifications of Road Metal.—The necessary qualifications of a good road stone for macadam are hardness, toughness, durability, and good binding properties; while in the case of setts the stone should be capable of maintaining a rough surface under friction. Other points to be considered are cleanliness in wear, ease of traction, and foothold, freedom from noise, suitability for gradients, and in the case of fashionable pleasure resorts, a good surface appearance during wear. It is worthy of note that the resolution adopted by the International Road Congress, in regard to the construction of the surface, provides for the use as far as possible of only ‘ hard, tough, and homogeneous road materials ’ regularly broken; making choice of a binder suitable to the structure of the road materials used, but reducing this binder to a minimum.

Granites.—Of the different kinds of road material the granites occupy the first position, although large quantities have to be rejected at the quarries in consequence of the stone having lost its toughness through turbidity of the felspar in weathering, a condition which quarrymen describe as ‘ dead stone.’ Granite is composed of quartz, felspar, and mica. Quartz is a hard, glossy, flinty substance and practically indestructible. Felspar is crystalline and lustrous, and it is on the small percentage of oxide of iron which it contains that the colour of the granite depends.

The best granites have a larger proportion of felspar than quartz, a small percentage of mica, and are very close-grained. Syenitic granites, in which hornblende (a silicate of lime and magnesia) takes the place of mica, make a better road material than the ordinary granite. When very dark in colour, on account of an increased percentage of hornblende, such granite has been found to be exceedingly durable.

The principal granite quarries are situated at Bardon Hill, Leicestershire; Clee Hill, Shropshire; Grosby, Leicestershire; Herm, near Guernsey; La Moye, Jersey; Markfield and Mount Sorrel, Leicestershire; and Portmadoc, Merionethshire.

Large quantities of Norwegian granite are now used, especially in the south-eastern counties of England, for kerbs, channels, and crossings. In districts near the Metropolis a great deal of Belgium limestone, known as quenast, has been used during recent years for road material. It is of a brownish-grey colour and at first sight looks like granite, but is softer and does not stand hard wear so well as granite.

Trappean Rocks.—Some excellent road stones are obtained from this class of rocks. Not being so hard as the more siliceous rocks, they do not possess the same tendency to wear to a smooth surface, although the presence of the ferro-magnesian constituents renders the stone exceedingly tough. Basalts of dark colour should be selected for road material.

The principal quarries are at Great Ayton and Rowley Regis in Staffordshire.

Greenstone obtained from these rocks also is compact, hard, tough, and durable. The principal varieties are obtained from the Penmaenmawr quarries near Carnarvon, and Bardon Hill in Leicestershire.

Limestones.—These may be classified according to their physical characteristics as follows :—(1) marble, (2) compact limestone, (3) granular limestone, (4) shelly limestone, and (5) magnesian limestone. Although limestones possess excellent binding properties they are too friable for use as surface material. Under the stripping effect of the pneumatic tyres of motor-cars, especially, the stone becomes pulverised, thus giving rise to impalpable dust when dry, and when wet such roads are most slippery and dangerous for rubber-tyred wheels. While the use of limestone as a surface material for main roads is decreasing, it may, nevertheless, be used as a binding material in conjunction with whinstone, or, it may be, with flints, in the steep gradients of secondary roads.

Sandstones.—Although sandstone is much used in the form of flagging, it is, as a rule, quite unfit for surface wear as macadam. An exception, however, occurs in the grey wether sandstone, or ‘ sarsen ’ stones which are freely used both for kerbs, as well as for macadam, in many of the chalk districts of the south, and in the west of England.

Flints.—These are found chiefly in the upper chalk in the form of nodules or pebbles, but large quantities are also obtained from gravel and shingle beds. The excessive brittleness of flint is the greatest drawback to its employment as a surface road stone, and renders fresh chalk flints almost useless for that purpose. When first quarried flints contain a small amount of water, which is lost by exposure to weathering influences, and under this process the flints become toughened. The superiority of weathered flints to those taken fresh from the chalk, for road-making purposes, is a fact long established by experience.

Flints form an excellent hardcore as they absorb less moisture than any other natural material of the kind, and for which purpose those gathered from the surface of the land are much to be preferred to those taken from pits. Such flints may also be used for the intermediate layers between the hardcore foundation and the surface layers of metal. Flints from the sea-shore, although tough and durable, are generally so rounded by attrition that they have no binding power whatever.

For roads that are subject to much motor traffic, or that are steam-rolled, the use of flints as a surface material cannot be recommended, although on account of their abundance and cheapness in many districts they will undoubtedly continue to be largely employed in the repair of country roads.

Chert, which may be regarded as impure flint, is extensively used as road stone over a considerable portion of the Weald under the name of 'Sevenoaks stone.' The same substance is sometimes spoken of as 'whinstone' in West Sussex, and 'red flint' in Surrey.

Gravel.—The most important of these deposits are the flint gravels, which are widely distributed over the country, even in localities far removed from the outcrop of the chalk formation from which the flints were originally derived. The shape of the stones composing gravel beds varies according to the amount of mechanical attrition to which they have been subjected. The beds may, therefore, be divided into pebble gravels, in which the stones have become so rounded as to possess little or no binding power; sub-angular gravels, in which the stones have been partially rounded by attrition; and angular gravels, in which the stones retain their original irregular form. Of these the angular gravels are best adapted for macadam. The roads made with this material are, however, only suitable for light traffic, and require constant attention to maintain a good surface.

Slag.—This consists of vitrified cinders from blast furnaces, and is extensively used as a road material in many of the iron-producing districts. The quality of the material varies considerably, depending as it does upon the nature of the ore and the kind of flux used in the smelting process, as well as upon the temperature of the furnace. In specifying for its use provision should, therefore, be made that the slag should be 'twice burnt,' otherwise, if obtained from a recently formed heap, it will contain a large percentage of sulphur, and will give off a most unpleasant smell after a shower of rain.

Slag possesses very little binding property, and limestone is therefore often used in conjunction with it for purposes of consolidation, as well as to tone down the sharp edges of the newly laid slag. The unequal wear, however, of the two materials produces a rough surface.

Road Surface Materials Generally.—In connection with the subject of road surface materials the views succinctly expressed, in 1833, by Sir H. Parnell in his 'Treatise on Roads' are still closely applicable to the subject. He says: 'With respect to the subject generally of road materials, it may be observed that the best descriptions consist of basalt, granite, quartz, syenite, and porphyry rocks. The *whinstones* found in different parts of the United Kingdom, Guernsey *granite*, Mountsorrel and Hartshill stone of Leicestershire, and the *pebbles* of Shropshire, Staffordshire, and Warwickshire are among the best of the stones now commonly in use. The *schistus stones* will make smooth roads, being of a slatey and argillaceous structure, but are rapidly destroyed when wet by the pressure of wheels, and occasion great expense in scraping and constantly laying on new coatings. *Limestone* is defective in the same respect. It wears rapidly away when wet, and therefore when the traffic is very great it is an expensive material. *Sandstone* is much too weak for the surface of a road; it will never make a hard one, but it is very well adapted to the purpose of a foundation pavement. *Flints* vary very much in quality as a road material. The hardest of them are nearly as good as the best limestone, but the softer kinds are quickly crushed by the wheels of carriages and make heavy and dirty roads. *Gravel*, when it consists of pebbles of the hard sorts of stones, is a good material, particularly when the pebbles are so large as to admit of their being broken; but when it consists of limestone, sandstone, or flint, it is a very bad one, for it wears so rapidly that the crust of a road made with it always consists of a large portion of the earthy matter to which it is reduced. This prevents the gravel from becoming consolidated, and renders a road made with it extremely defective with respect to that perfect hardness which it ought to have.'

Hardcore.—In the London districts the foundation or bottoming of a macadamised road is usually formed of 'hardcore.' This generally consists of material that is obtainable in the locality. Taken in order of merit, the materials used may be classified as follows:—Flints (surface picked), chalk, clinkers, old bricks or building stones, drain pipes, and the refuse (not dust) of masons' yards. Burnt ballast is sometimes used, but it is liable to fracture under heavy pressure, and in damp situations to become as soft as clay if not thoroughly burnt.

Care should be taken that very large compact pieces of hardcore should be broken up, or they may cause the roller to subside heavily on the softer material beyond it, thus causing a hollow which under further rolling will become more pronounced.

Hoggin.—This consists of screened or sifted gravel, and is generally used as a binding material, especially as topping for macadamised roads.

Cost of Materials.—The following are the comparative prices of machine-broken road-stone and other materials delivered in London :—

Kind of material.	Size.	Per ton.	Carriage to London terminus.	Approx. total cost, per ton.	Approx. cost, per cub. yd.
	ins.	*s. d. s. d.*	*s. d.*	*s. d.*	*s. d.*
Blue Guernsey Syenitic Granite	2–2¼	6 10–7 2	4 0	11 0	12 6
Do. do.	1½–1¾	7 4–7 8	4 0	11 6	13 0
Leicester Syenitic Granite (Mount Sorrel)	2–2¼	4 9–5 0	6 3	11 2	12 9
Do. do.	1½–1¾	5 3–5 6	6 3	11 2	13 6
Leicester Syenitic Granite (Stoney Stanton)	2–2¼	5 0–5 6	5 6	10 9	12 0
Do. do.	1½–1¾	5 6–6 0	5 6	11 3	12 8
Basalt (Bardon Hill) . .	2–2¼	5 3–5 6	5 6	10 9	12 6
Do. do. . .	1½–1¾	5 9–6 0	5 6	11 5	13 0
Granite (Penmaenmawr) . .	2–2¼	4 0–4 9	8 6	12 8	14 6
Do. do. . .	1½–1¾	4 3–4 8	8 6	13 0	15 0
Syenitic Granite (Alderney) .	2–2¼			14 0–14 3	
Do. do. .	1½–1¾			14 4–14 9	
Quenast	2			10 0–10 6	
Do.	1½			10 6–11 6	
					s. d. s. d.
Slag					8 0–10 0
Flints (best Kentish chalk)					4 0– 5 6
Double screened ballast					4 6– 6 0
Ordinary burnt ballast					3 0– 4 0
Hardcore (broken stone or brick)					2 6– 3 6
Red pit gravel or hoggin					3 6– 4 6
Gravel					3 0– 4 0
Chalk					3 6– 5 0
Sand (pit or river) clean, sharp. unwashed					5 0– 6 0
Do. do., washed					6 6– 7 0

A cubic yard of loose broken stone contains about one-half of its volume, or 13½ cubic feet, of solid stone, and its weight, allowing 12 cubic feet of solid granite to the ton, is approximately 1 ton 2½ cwt., or 1⅛ tons.

CHAPTER VII

METHODS OF 'FORMING' AND 'MAKING UP' OF NEW STREETS AND ROADS

Formation of Roads.—It is customary in the Metropolitan and many other districts for the owner of a property, who intends to develop it for building purposes, to 'form' the necessary roads with macadam, after having first obtained the approval of the road plans by the Local Authorities. The term 'form' is a rather elastic one and may imply the laying of a 12–16 in. foundation and 10–12 in. of intermediate and surface materials for the carriage-way, with the necessary kerbing and channelling, and a proportionate expenditure on the footpaths, so that the ultimate cost of making up, before the road is formally taken over by the authorities, is reduced to a minimum. Or, what is known as a 'builders' road' may be contemplated, in which the expenditure in formation will be curtailed as much as possible, and the only road metal applied will be that found necessary to enable the builder to haul his materials to the several sites. In the latter case, the cost of making up the road before it is taken over will be proportionately increased, as the work will include, in a large measure, the laying of a proper foundation, as well as the intermediate and surface materials. Such a mode of procedure is not, however, without its advantages, more particularly in connection with small blocks of building property, as the development may take place without entailing any considerable outlay on roads, except, of course, in the laying of the necessary sewers. When the road is ultimately made up by the Local Authorities, the cost will be apportioned on the owners or lessees of the several houses fronting the thoroughfare, and in this way the original owner may be relieved of all pecuniary liability in respect of such road. Notwithstanding these advantages, the method cannot be recommended in the development of a good-class estate of any appreciable magnitude.

In some cases paved roads are constructed, or provision may be made by means of a concrete or paved foundation for the thoroughfare to be ultimately finished as a paved road, but this work is seldom carried out except under a special arrangement whereby a proportion of the cost is borne by the Local Authorities.

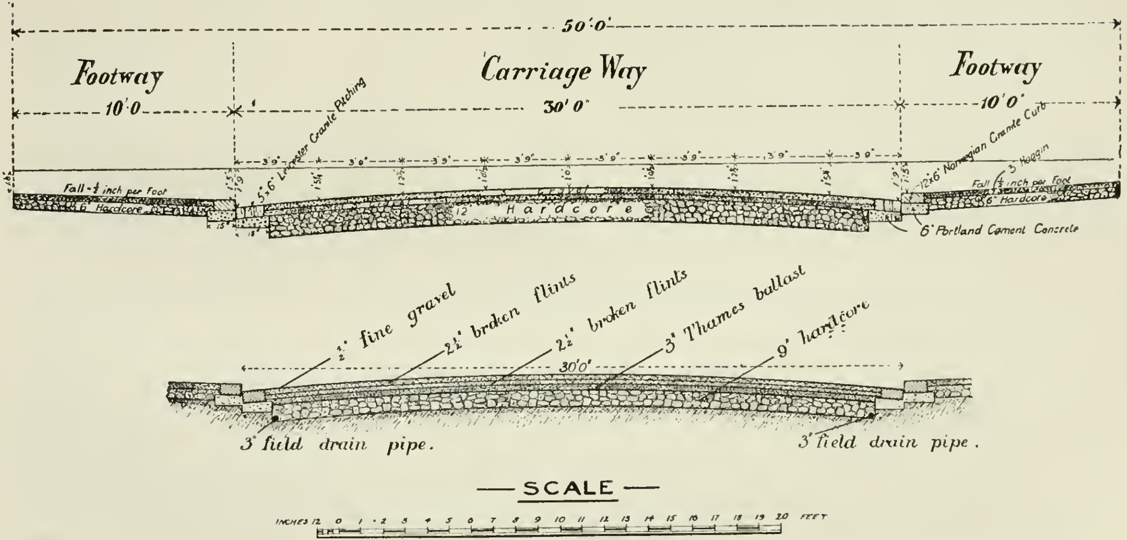
From a legal point of view, the formation of a new street begins when, under a more or less systematic method of development, an owner has built his first house with the intention of going on and building others, and that irrespective of the application of any road material to the surface. Where, however, the land fronting what may eventually be considered a street belongs to several different owners, and it is evident that they intend to utilise such way for building, the one who first begins to build begins to form and lay out a new street. Such tentative methods of procedure are, however, somewhat outside the scope of this treatise.

Method of Formation.—It is essential to the efficiency of a road that, sooner or later, the foundation should be laid sufficiently firm and substantial to support the traffic to be carried over it. In the formation of macadamised roads the foundation-bed is usually prepared to the intended contour of the finished roadway, as shown in section (Figs. 4 and 5), and from 12 to 18 inches below its surface. If curved in this manner an equal thickness of metal will be deposited over the whole width of the road. Telford advocated a level foundation-bed so as to ensure a greater thickness of road material in the middle, where the traffic was greater than at the sides, but this method is not often adopted in modern practice.

The foundation-bed having been formed and consolidated by rolling, from 12 to 15 in. of hardcore or broken stone is then put on in two separate layers, each layer being watered and well rolled before the application of the next course. It is a good plan to make the bottom layer of rather larger stones than those above. Upon these two depths of hardcore a 3–5 in. layer of gravel or Thames ballast is placed and well rolled to complete the foundation. The thickness of the hardcore foundation will depend in some measure upon the kind of material used, the nature of the subsoil, and the amount of traffic. It might with advantage be made 15 in. on a soft clay for a main thoroughfare, although on a gravelly or other fairly resistent subsoil from 9 to 12 in. may be sufficient for an ordinary road. These depths would, by rolling, be consolidated to about 13½ in. and 8–10½ in. respectively.

For the purpose of completing the road formation two 3-in. layers of flints or other metal are laid in separate sections, and thoroughly consolidated

CROSS-SECTIONS OF 50-FT. ROADS.



Figs. 5 and 6.

by rolling, and a finishing coat of 1–1½ in. of hoggin or screened gravel is spread, watered, and rolled.

In order to prevent the possibility of any misunderstanding as to the depth or thickness of the several layers of material, it is advisable to make specific provision that the measurements are to be taken after the several courses have been rolled and consolidated, and also that, when measured at completion, the difference shall not exceed one-twelfth part of the aggregate thicknesses. The shrinkage through consolidation will, of course, vary with different kinds of material, but the general allowance is one-fourth of the original volume, and will be approximately as shown in section in Fig. 5, and in the following statement :—

Kind of material.	Dpeth before rolling.	Depth after rolling.	Depth at completion.
	ins.	ins.	
Hardcore ..	12	9	16 in.
Gravel or Thames ballast ..	4	3	
Flints or broken stone	3	2¼	
Ditto	3	2¼	
Hoggin or fine gravel ..	1	½	

Where necessary to provide for the drainage of the road-bed, a line of 3-in. land drain pipes may be laid along each side, as indicated in the preceding section (Fig. 6) :—

Subsidiary Drain Roads.—On properties intended for the erection of comparatively small villas or terraced houses for the working classes, subsidiary roads may with advantage be formed at the back of the houses for purposes of drainage, and as a secondary means of access for the removal of refuse. These may be formed with a foundation of 6–9 in. of hardcore and 3–4 in. of gravel, each layer to be well rolled and consolidated.

Pitched or Pinned Foundation.—In place of the hardcore foundation already described, a 'pitched' or 'pinned' foundation is sometimes adopted. This mode of construction permits of a saving of surface road metal on account of its greater solidity, a 3-in. layer with some binding material being generally sufficient; it offers increased facility for the underdrainage of the roadway, and resists more effectually the wear and tear of the traffic.

The method of constructing such a foundation for a 30-feet roadway, as recommended by Telford, was as follows:—'Upon the level bed prepared for the road materials, a bottom course or layer of stones is to be set by hand in form of a close, firm pavement; the stones set in the middle of the road are to be seven inches in depth; at nine feet from the centre five inches; at twelve feet from the centre four inches; and at fifteen feet three inches. They are to be set on their broadest edges lengthwise across the road, and the breadth of the upper edge is not to exceed four inches in any case. All the irregularities of the upper part of the said pavement are to be broken off by the hammer, and all the interstices to be filled with stone chips firmly wedged or packed by hand with a light hammer, so that when the whole pavement is finished there shall be a convexity of four inches in the breadth of fifteen feet from the centre.'

The convexity or rise of the road was thus obtained by regulating the depth of the stones used at various distances from the centre, and which gave the form of a flat ellipse.

In modern practice it is, as we have previously stated, customary to grade and shape the road-bed to a depth of about 14 in. from the level of the gutters, and with a cross-section agreeing with that of its finished surface. This is repeatedly rolled with the steam roller and depressions made good with subsoil. On the bed thus formed and consolidated an 8-in. layer of stones is set by hand and rammed in its place by sledge hammers, all irregularities of surface being broken off and interstices wedged with pieces of stone. A 4-in. layer of 2–2½ in. metal is then spread and rolled in with ½ in. of sand. In some cases this is followed by a 3-in. layer of 2-in. metal and sand, to be rolled in as before, and to be finished with a binding of clean sharp sand to be watered and rolled until a firm, compact, and smooth surface has been obtained.

Concrete Foundation.—A still better foundation may be formed with concrete, but this being much more expensive is seldom adopted except for extraordinary situations, where the ground is soft, where round pebbley gravel is to be used, and which would otherwise be unsuitable for the purpose, or, where, by special arrangements with the Local Authorities, the road is ultimately intended to be paved. Concrete is, however, equally suitable as a foundation for the ordinary macadamised surface as for paving.

The foundation usually consists of a 6-in. layer of hydraulic lime concrete, in the proportion of four to six parts of good clean gravel to one of lime. The mixture being thoroughly incorporated is at once spread evenly over the prepared road surface. Upon this bed, before the concrete has become quite hard, a 3-4 in. layer of broken stone is spread and well rolled. By this means a considerable proportion of the layer of broken stone is pressed into the concrete and is thus held firmly in position.

In connection with this mode of formation, Mr. James Hall stated in a paper read before the Association of Municipal and County Engineers that 'The only objection to a road formed with a concrete bottoming is its first cost, which precludes its general use. In towns, however, where it is considered desirable to have a broken-stone road, a better foundation could not be obtained; one of its great advantages is that, becoming a compact mass after setting, the weight is evenly distributed over the whole surface of the roadway, thus preventing, to a very large extent, an uneven surface, which is often found in roads where the traffic is heavy. Concrete can be made both with lime, lias lime, and cement; the latter is preferable. When a concrete foundation is to be used, great judgment should be exercised in the proper time the metal should be spread. Some engineers say that the concrete must be allowed to get thoroughly set, then covered with a thin coating of fine gravel (pit gravel preferred), and the required thickness of metal then spread; while others consider it better to spread the metal upon a thin coating of gravel before the concrete is set, and roll the surface until the metal has partly embedded itself in the concrete. I am strongly of opinion that the latter plan is the better. The road, however, must not be opened for traffic until the concrete is quite hard, and until after the first coating of metal has been covered with a thin coat of finely broken material.'

Rolling.—Reference has been previously made to the importance of rolling, both in the consolidation of the road-bed, and also of the coatings. Although the first steam roller was made as recently as 1864, it is now regarded as a necessity in the formation, as well as in the repair of macadamised roads.

The advantages which the steam roller offers in the formation of roads on building estates, may be briefly stated as follows :—

(1) A harder and more even surface can be secured, thus affording facilities, in the first place, for the haulage of builders' materials, and secondly, for the approach of tradesmen's carts and other vehicles ;

(2) A saving of time in the consolidation of roads and subsequent development of estate ;

(3) The cost of reparation prior to the roads being taken over by the Local Authorities is materially lessened ;

(4) A greater economy in the road metal, (*a*) in quantity, by reducing to a minimum the waste by abrasion during consolidation, and the use of a thinner coating ; (*b*) in size, because the metal need not be broken so small.

In order to obtain the best results, however, the following points should be attended to :—

(1) The roller should not be too heavy, or otherwise it will (*a*) crush rather than bed the metal ; or (*b*) injure the foundation of the road ; damage gas or water mains (if laid), or even sewers.

(2) The roller should not be too wide, or it will tend to flatten the contour of the road.

(3) The haunches of the road should always be rolled first, and to a sufficient degree of firmness to prevent the external spread of

material when the roller passes over the centre.

(4) A proper quantity of binding material should be used in the consolidation, as well as of water.

The weight of the roller to be used should be regulated by the kind of road metal to be compressed. A roller of seven to ten tons is best for soft material, such as limestone or Kentish rag; while for that obtained from tough igneous rocks, the roller should not be less than fifteen tons in weight. The question of weight will also call for consideration in connection with the road-bed for which, if comparatively soft and yielding, a heavy roller should not be used. The weight will be influenced by gradient, as extra power will be required up-hill as well as in the application of the brakes for down-hill rolling. The steepest gradient upon which a 15-ton roller will act has been found to be one in nine, although one in fourteen can be managed without much trouble either in the ascent or descent. For general use a 6-ton roller is regarded as being sufficiently heavy for gravel roads and steep gradients; ten to twelve tons for macadam, and fifteen tons for the hardest quality of road material.

The width of the roller should also be regulated by its weight, which, for the sizes above mentioned, should be from one-and-a-half to two tons, per foot, of width.

In the formation of a new road it is desirable that each layer of hardcore and metal should be thoroughly dry-rolled, in order to force the newly laid stones into as close contact as possible before any binding material is applied. The number of turns necessary for each layer will vary considerably in different cases, and will depend on the weight of the roller, the kind of materials, and the thickness of the layer. It is scarcely possible to lay down any hard-and-fast rule in this respect, but in extreme cases a 10 to 12-ton roller may have to pass over the site as many as forty to fifty times before the materials are thoroughly consolidated.

It has been conclusively shown, however, by experiments that broken stones of the ordinary sizes, and of the best quality for wear and durability cannot, without the addition of suitable binding material, be consolidated in the effectual manner required for the finished surface of a road by steam rolling. The most commonly used material for binding is road grit or scrapings, but sharp sand is also employed, as well as gravel or stone chippings and screenings. The binding should, if possible, be of the same kind of material as that of which the road is formed, and should be well watered whilst being rolled in.

Cost.—It is almost impossible to state the quantity of work which a roller is capable of performing in a day, as so much depends upon the nature and thickness of the stones, the gradient, and the number of stoppages and interruptions. Messrs. Aveling and Porter's general estimate of, from 1,000 to 2,000 yards of newly laid metal, per diem, will probably be found to apply to thin coatings, and in the formation of new roads from one-fourth to one-half of this area will be nearer the mark. The cost of working a steam roller, with attendance, is about £2 per day, and the cost per square yard may, therefore, be put at, from a half-penny to twopence, according to the thickness of the material and the steepness of the gradient.

DRAINAGE.

Drainage Essential to Development.—As already indicated, it is possible, in some cases, to develop small properties without incurring much initiatory expenditure in the formation of roads. In the matter of drainage, however, an owner who proceeds to erect houses on a property situated in an urban district, without making the necessary provision for the disposal of sewage and slop-water, renders himself liable, under sec. 25 of the Public Health Act, 1875, to a penalty of £50. Before a suitable property can be developed for building purposes, therefore, it is essential that the necessary sewers or drains should be laid. The question of expenditure will depend largely on the requirements of the bye-laws and regulations, as well as on the system of drainage adopted in the locality. The first step to be taken by an owner, or his representative, is to make a careful inspection of the drainage map of the district, and to find out what special provisions have to be made to meet the local bye-laws and regulations.

'Combined' or 'Separate' System.—The two methods of drainage that are generally in vogue are known as the 'combined' system, where all sewage, slop, and surface water are carried in the same sewer; or as the 'separate' system, where the sewage and slop water are carried in one sewer, and the surface and rain water in another. Each system has its advantages and disadvantages, but as it is not left to an owner to choose which system he will adopt, no good purpose can be served by dwelling on this side of the question. Some things are beyond criticism. It is satisfactory,

however, to note that the advantages offered by the less expensive system are gradually being appreciated by municipal engineers. In several districts where the separate system has been adopted, the surface drainage of the streets, and a portion of the rain-water from the buildings are now taken into the soil sewers.

Where the ' combined ' system is in force the size of the sewers will, of course, be proportionately larger than where the ' separate ' system has been adopted. In estate development, however, it is seldom that anything larger than an 18-inch pipe sewer is required. Salt glazed stone-ware pipes may with advantage be used up to 18-in. diameter, but above that size brick sewers offer advantages both in regard to cost and efficiency.

The egg-shaped form of brick sewer is usually adopted, with the small end of the egg downwards. The bricks used should be close grained, thoroughly burnt, free from lime, blisters, cracks, &c., and give a clear ringing note when struck with a hammer.

Iron pipes are seldom used except in special circumstances, such as brook or river crossings, or loose ground, but in any case they should be thoroughly coated, both inside and out, with Dr. Angus Smith's solution before they are laid.

Size of Sewers.—In estimating the size of the sewers required for an estate, the following among other matters should be carefully considered :—

(1) The area of the estate to be drained ;
(2) The nature of the soil (whether porous or retentive), and its effect on the disposal of the surface water ;
(3) The surface configuration in its bearing on the fall of the sewers ;

(4) The probable future population to be served, allowing about 30 gallons, or 5 cubic feet, per head, per day, one-half of which will pass off in about five hours ;

(5) The amount of rainfall likely to enter the sewers. This is usually taken, per house, as follows :—

From roofs (horizontal measure)	·5	inches in depth
Flagged areas	·25	,, ,, ,,
Paved ,, ...	·125	,, ,, ,,
Gravelled ,, (clay subsoil)	·05	,, ,, ,,
,, ,, (chalk subsoil)	·01	,, ,, ,,

From calculations based on an appreciation of the foregoing points, the proper size and fall of the sewers that will be required for an estate may be determined.

The velocity of flow in 18-in. pipes should not be less than 2·5 feet per second ; in 12–15-in. sewers, 3 feet per second ; and in 6–9 in. sewers, 3½ feet per second.

Table of circular pipe sewers or drains with velocities necessary to render them self-cleansing, and approximate rates of discharge :—

Diameter in inches	Fall.	Velocity in feet per second.	Discharge,	
			Cub. ft. per minute.	Gallons per minute.
6	1 in 60 2″ in 10 ft.	4½	106	662
9	1 in 90 1½″ in 10 ft.	4½	159	993
12	1 in 226 ½″ in 10 ft.	3	141	881
15	1 in 300 $\frac{7}{16}$″ in 10 ft.	3	177	1106
18	1 in 350 ⅜″ in 10 ft.	3	212	1325

In the foregoing data it is assumed that the pipes are free from incrustation, and that there is a mean velocity.

Eytelwin's rule for calculating the discharge from drains and sewers is to multiply the hydraulic mean depth, in feet, by twice the fall, in feet, per mile; take the square root of the product and multiply it by 55; the result is the mean velocity of the stream, in feet, per minute. The formula is—

$$V = 55 \sqrt{x \times 2f}$$
$$C = V \times A$$

Where $x =$ Area of sewer $\div$ the wetted perimeter, in feet.
$f =$ Fall, in feet, per mile.
$V =$ Velocity, in feet, per minute.
$A =$ Area, in square feet.
$C =$ Cubic feet of water delivered, per minute.

The hydraulic mean depth and sectional area of circular pipes may be computed from the following data:—

Hydraulic mean depth.		Sectional area.
Flowing full	$= d \times \cdot 25$	$= d^2 \times \cdot 785$
$\frac{2}{3}$,,	$= d \times \cdot 292$	$= d^2 \times \cdot 556$
$\frac{3}{4}$,,	$= d \times \cdot 296$	$= d^2 \times \cdot 632$
$\frac{1}{2}$,,	$= d \times \cdot 25$	$= d^2 \times \cdot 393$
$\frac{1}{3}$,,	$= d \times \cdot 186$	$= d^2 \times \cdot 229$
$\frac{1}{4}$,,	$= d \times \cdot 147$	$= d^2 \times \cdot 154$

$d =$ diameter of pipe in feet.

Depth of Sewer.—The depth of the new sewer may have to be governed by that of the main sewer to which it has to be connected. If the main sewer should happen to be at a considerable depth, and the surface configuration of the land affords a sufficient fall, arrangements may possibly be made with the Local Authorities for the introduction of a tumbling bay, or declining-curve junction (see Fig. 26). In order that this may not have a disturbing effect on the sewage, it should be kept at a point not less than 100 feet from the main sewer. The depth of the new sewer being then planned to the natural slope, the cost of excavation may be reduced to a minimum, provided, of course, that the depth is sufficient to receive the drainage of any houses that may be constructed with basements.

Where the pipes are laid at a greater depth than 12 feet below the surface, they should be encased in 6–12 in. of cement concrete to relieve them of the pressure of the earth above. The same provision should also be made where the pipes are less than 3 feet below the surface.

Pipes.—The sewer pipes, junctions, and bends should be of stoneware with sockets, and obtained from an approved maker. The pipes should be thoroughly burnt, and salt glazed internally and externally, the internal surface being quite smooth and free from cracks and blisters, and the interior of the socket should be rilled, as well as the spigot end, to the depth of the socket. The pipes should be of a thickness proportionate to their internal diameter, as indicated in the following table :—

Diameter.	Thickness.	Length.		Depth of sockets.
in.	in.	ft.	in.	in.
6	$\frac{5}{8}$	2	0	2
7	$\frac{3}{4}$	2	6	$2\frac{1}{4}$
8	$\frac{7}{8}$	2	6	$2\frac{1}{4}$
9	1	2	6	$2\frac{1}{2}$
10	1	2	6	$2\frac{3}{4}$
12	1	2	6	$2\frac{3}{4}$
15	$1\frac{1}{8}$	3	0	3
18	$1\frac{1}{4}$	3	0	$3\frac{1}{4}$

The pipes should be cylindrical in bore, and should be matched before they are laid in the trench, so that when jointed they may form by the invert the truest possible alignment. In this connection it is well to bear in mind that scientific accuracy, in regard to size and form of large pipes that have to be thoroughly burnt and salt glazed, has not yet been attained even by the best makers, and some allowance must therefore be made to meet the deflections that are incidental to their manufacture. The extent of this allowance is, of course, open to question, but the rule adopted by the writer is to pass 12-in. pipes, the cross-diameters of which do not vary more than $\frac{1}{4}$ in. from the specified bore, or 18-in. pipes with a variation of $\frac{5}{8}$ in., and to make a proportionate allowance in respect of other sized pipes. Pipes that will not pass this test of bore-measurement, although otherwise satisfactory, are discarded. Their straightness and aggregate deflection may also be checked by passing through each pipe a cylindrical plug of the full length of the pipe, but of less diameter, in proportion to the allowance to be made for the defects before referred to.

Pipe Laying.—The pipes should be laid in perfectly straight lines, so that the flow of sewage passes the socket end of the pipe first, and with uniform gradients between the manholes, the bottom of the trench having been previously rounded to the shape of the body of the pipe, and a further excavation made for the socket with space for the operator's hand to pass underneath, so that the body of the pipe will be supported throughout its whole length (see Fig. 7). The joint should be executed with great care, the form generally adopted being that shown in the accompanying illustration (see Fig. 8). It consists of a gaskin of rope-yarn steeped in tar or cement and wrapped two or three times round the spigot end of the pipe, before it is inserted in the socket. This is then rammed in so as to fill the extreme end of the space between the socket and the pipe for a depth of ¾ in. all round, and Portland cement, or Portland cement-mortar, is then applied to the joint and finished off with a

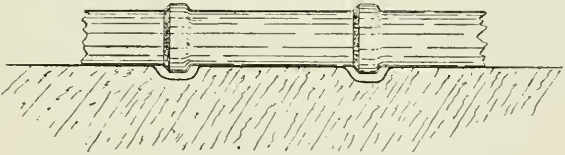


Fig. 7.

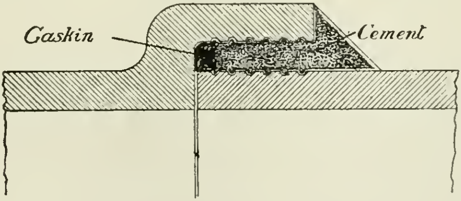


Fig. 8.

fillet making an angle with the edge of the socket and pipe of not less than 45°, and so as to leave the joint absolutely water-tight. The weakest part of this joint is in the lower portion of the pipes, which is concealed. To make a thoroughly good joint the spigot requires to be raised slightly, and, after being carefully adjusted, to be packed with cement. The difficulty in keeping the invert in perfect alignment arises from the socket being of necessity made larger than the spigot, in order to allow room for the jointing of the material. If the spigot end is fixed at a lower level than the invert at the socket end, as indicated in the accompanying diagram (Fig. 9), the joint may be water-tight, but the defect will, nevertheless, give rise to the formation of an obstructive ledge which will arrest the flow of solids, especially if the gradient is slight, and thus in time cause a proportionate reduction in the capacity of the sewer.

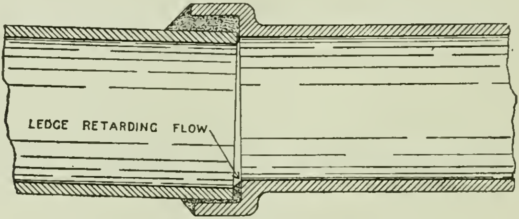


Fig. 9.

Special Pipe Joints.—To obviate the defects above referred to numerous special and patent joints have been placed on the market, some of which are sufficiently yielding or flexible to remain gas and water-tight in spite of a slight settlement of the ground or bed, but unfortunately in many cases the materials of which the joints are composed are not anything like so durable as Portland cement.

Some special joints are of the wedge or compression class, others take the form of screws, whilst others again are some form of ball and socket arrangement, which permits of a somewhat considerable displacement of the pipes taking place before any leakage occurs. Hassall's patent socket-jointed pipes are highly esteemed by many engineers for use in running sands, or wet situations where a good and quick joint is required. Boulnois describes the joints of the pipes as follows:—' Two bands of special bituminous material are cast on to the spigot end of the pipe about 1½ in. apart, and corresponding rings of the same tough mixture are cast inside the pipe socket also about 1½ in. apart. These two sets of rings, when the pipes are together, form an annular space round the whole joint of the pipe which is filled, through a hole provided for the purpose, with liquid cement which travels completely round the pipe, driving before it any air, water, grits, or dirt that is in the space. This also tests the joint, for should there be any leakage it will appear during this operation. When the cement has set it

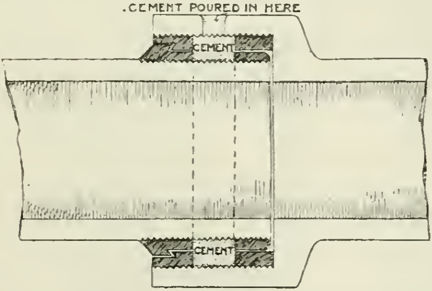


FIG. 10.

will be seen on reference to the section shown in Fig. 10 that this joint hermetically closes the pipes and prevents the possibility of any leakage, and from its double bearing lessens considerably the chances of any settlement.'[1]

The same method of filling the joint is adopted for Wakefield's corrugated socket pipe, but the great advantage which this pipe offers is the ease with which it can be laid and a true invert ensured, as the space between the top of the corrugations and the invert line of the pipe corresponds with the thickness of the spigot end of the pipe which rests upon the corrugations. The space between the corrugations is filled with cement through a hole provided for that purpose.

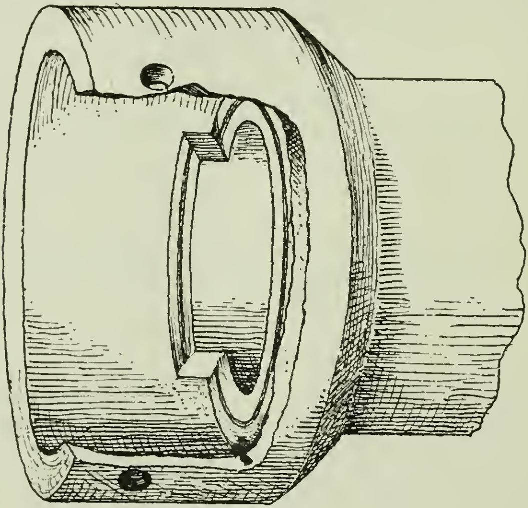


FIG. 11.

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[1] *The Municipal and Sanitary Engineers' Handbook.*

A more recent invention of a somewhat similar pipe is known as the Recess Socket pipe, by the same patentee (see Figs. 11 and 12). In this case it is claimed that when the spigot is placed in position within the socket a true invert is formed; while at the same time a clear annular space is provided for the pipe-jointer to make the joint easily and effectively. The joints for both of these pipes may be made either with Portland cement or with jointing composition.

In Doulton's 'Grouted Composite' joint, which is specially serviceable in water-logged soils, an inner seal is formed by a bituminous band being cast on the spigot as well as on the socket of the pipe, thus permitting of the pipes being self-adjusting, whilst preventing the entrance of the cementing material, and an outer seal is finished with Portland cement grout. In the formation of the latter seal, the cement grout is poured into an annular chamber formed by a band of canvas held in position between the end of the socket and collar by a binding wire. All air and superfluous

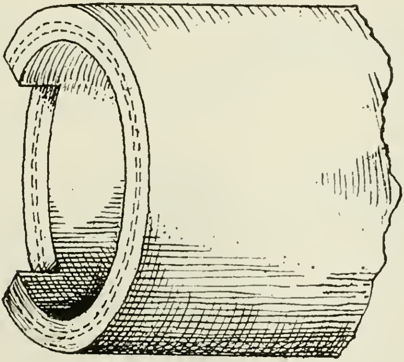


Fig. 12.

water thus escape through the porous canvas, and the cementing material is therefore visible from the outside of the completed joint (see Figs. 13 and 14). The canvas is allowed to remain in position, and its decay is, of course, immaterial.

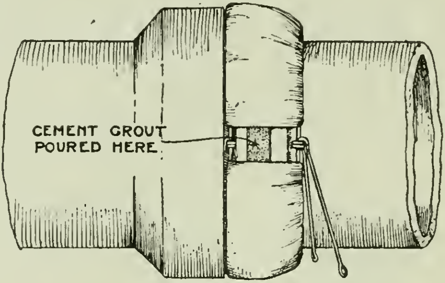


FIG. 13.

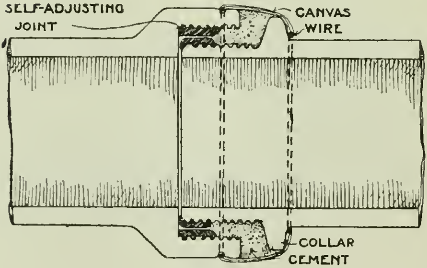


FIG. 14.

Sight Rails.—To facilitate the laying of the pipes two or more sight rails should be set up and levelled, as indicated in the following sketch (Fig. 15). From levels previously taken, the first sight rail is set up at the point D, at the lower end of the drainage, 15 feet (length of boning rod) above the invert of the sewer, and 85 feet above Ordnance datum. The level may then

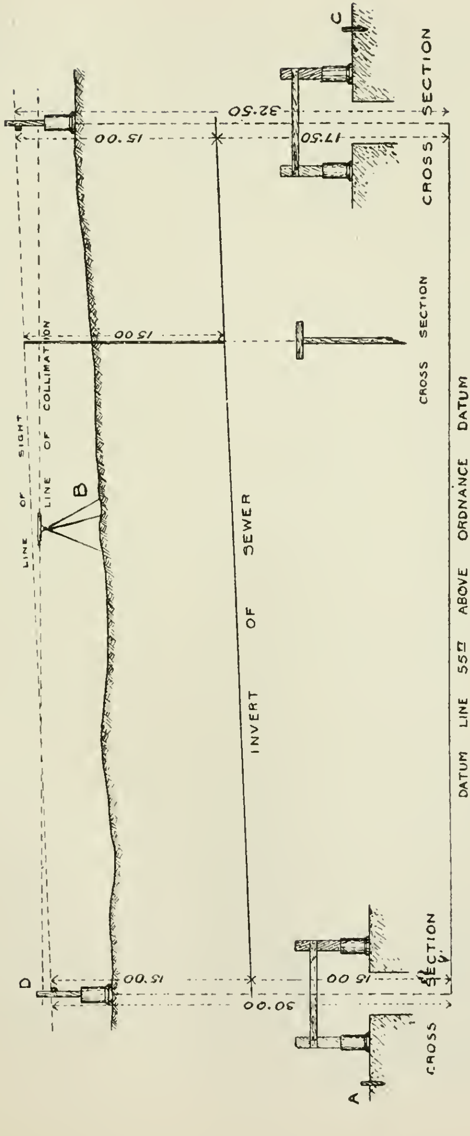

LINE OF SIGHT
LINE OF COLLIMATION
B
INVERT OF SEWER
DATUM LINE 55 ABOVE ORDNANCE DATUM
C
32·50
15.00
17.50
CROSS SECTION
15.00
CROSS SECTION
D
15.00
15.00
30.00
CROSS SECTION
A

Fig. 15.

be set up at point B, near the centre of the length of drainage to be dealt with, and a reading taken (back sight) with the staff held on the top edge of the first sight rail. The staff should then be placed on the peg C, and a reading taken (fore-sight), the difference between these readings subtracted from the height above Ordnance datum of the first sight rail gives the height above such datum of the peg C. The level should then be moved and a reading taken with the staff held on the peg C (back sight), where the invert of the sewer is 72·50 feet above Ordnance datum. The staff should then be moved up or down one of the uprights prepared for the second sight rail until it shows the required height of 87·50 feet (= 72·50 feet + 15 feet), this reading representing the difference between the height above Ordnance datum of the peg C, plus the back sight reading on this peg, and the required height above Ordnance datum of the second sight rail. When this is done the foot of the staff will represent the point where the upper edge of the second sight rail should be placed.

The rails should be checked every day before the laying is commenced, and should be made of 1-in. cross-boards marked with the sewer axis. The posts carrying the rails are frequently kept in position by being stood upright in two drain pipes resting on their socket ends, and filled with sand that is rammed down tightly. The boning rod is made of wood with cross-piece accurately joined at right angles in the form of the letter T, the rod being of a length to suit the depth of the sewer. The foot of the rod may with advantage be fitted with a shaped shoe to rest on the invert of a pipe when laid, and thus ensure an accurate bearing.

Testing Sewers.—The water test should be applied to each length of sewer or surface water drain after a sufficient time (usually about three days) has been allowed for the joints to set. At the upper end of the length of sewer to be tested, two lengths of stand-pipe with bend are fixed, with clay joints, to a height (generally about 5 feet)[1] sufficient to permit of the necessary pressure being applied. The lower end of the length of sewer being then plugged so as to be made watertight, the conduit is filled with water and allowed to remain under pressure for some five or six hours. If the joints are water-tight and the pipes are sound, the level of the water will remain standing, but in case of a leakage the water will gradually descend in the stand-pipe. In the latter case the defects must be found, and remedied, after which the water-test is again applied. This test is generally applied by, or under the supervision of the engineer to the Local Authorities. When the sewers have been completed they are subjected to a final water test, the total length of sewer in each road being filled with water in the same manner as already described for its several sections.

Cost.—The cost of constructing sewers will vary according to the kind of subsoil to be excavated, the depth of the trench, the distance from rail, and price of labour. In the following statement is given the approximate average cost, per lineal yard, in the Metropolitan district, including excavation for and laying of best quality London pipes, jointing same in cement, filling in and ramming, and spreading surplus earth on site, but exclusive of cement concrete foundations :—

---

[1] = A mean pressure of 2 to 2½ lbs. per square inch.

Depth of sewer.		Internal diameter of pipes.									
		6 in.		9 in.		12 in.		15 in.		18 in.	
ft.	in.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
3	0	4	0	5	6	7	6	10	0	15	0
4	0	4	6	6	0	8	3	11	0	16	0
5	0	5	0	6	9	9	0	12	0	17	0
6	0	6	0	7	3	9	9	13	0	18	0
7	0	6	9	7	9	10	6	13	6	19	6
8	0	7	6	9	0	11	0	14	0	21	0
9	0	8	3	10	3	12	0	14	6	22	6
10	0	9	0	11	0	12	9	15	6	23	9
11	0	10	6	12	0	13	9	16	6	25	6
12	0	12	0	13	0	14	9	17	6	27	6

If second quality pipes are used, a reduction of 15 to 20 per cent. might be effected on the above figures, but it is generally regarded as false economy to use other than best quality materials for sewer construction. Although readily distinguishable by the expert, a novice may experience some difficulty in detecting the difference between ‘ best ’ and ‘ second ’ quality pipes, but if ‘ best ’ quality pipes are specified it is well to see that they are used, especially having regard to the fact that there is a difference of some 25 per cent. in the cost price of the two kinds of pipes.

If bedded in 6 in. of cement-concrete with haunching up on each side of the pipes, the additional cost, per lineal yard, would be from 2*s.* 6*d.* for 6-in. pipes to 5*s.* for 18-in. pipes.

Brick Sewers.—The average cost of brick sewers complete, including excavating to an average depth of 12 feet, with brickwork set in cement and having concrete backing, is approximately as follows :—

	Per lineal yard.						
ft. in.	£	s.	d.		£	s.	d.
2 0 diam. with 4½ in. brickwork ..	1	15	0	to	2	5	0
2 6 ,, ,, ,, ,,	2	0	0	,,	2	15	0
3 0 × 2 3 (egg shape) with 9 in. do.	2	10	0	,,	3	5	0
4 0 × 3 0 ,, ,, ,,	3	0	0	,,	4	0	0
5 0 × 3 6 ,, ,, ,,	3	15	0	,,	5	0	0

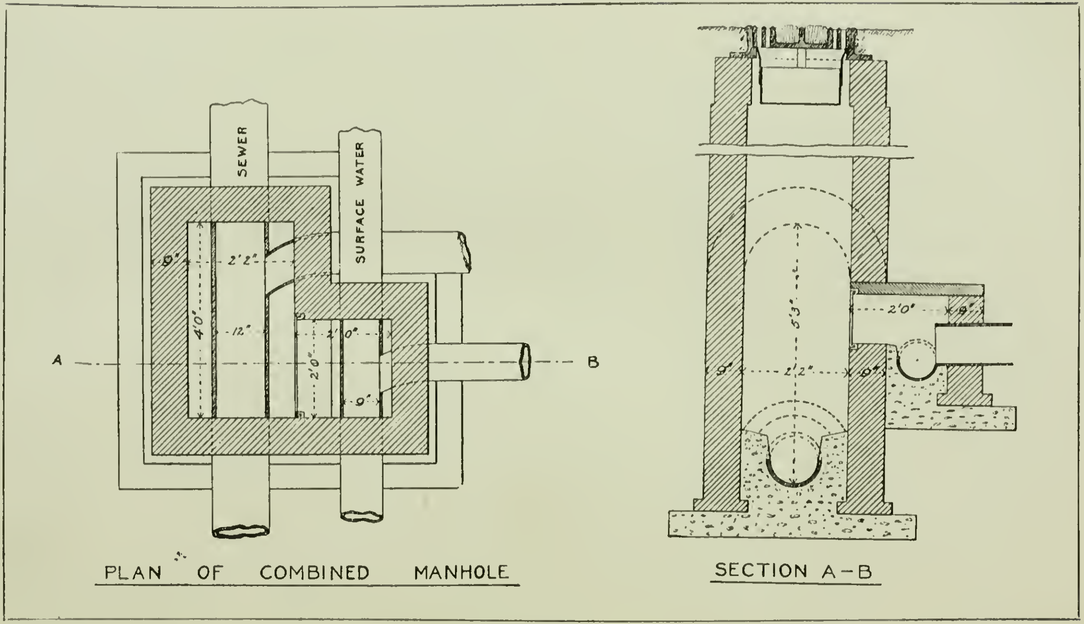
Manholes.—Manholes should be provided at every bend in a length of sewer, at each change of gradient, where tributary sewers join, or at intervals of 100 yards on a straight line of pipe sewer. Where a bend or change of gradient occurs at a point somewhat in excess of 100 yards from the preceding manhole in a straight length of pipe sewer, a lamphole may be formed midway between the two manholes.

For brick sewers the manholes are often placed further apart, or from 130 to 150 yards.

Form of Manholes.—The form of the manholes is somewhat varied in different localities, and may be either in the common square or rectangular form, shown in Figs. 21 and 24 (see pp. 334 and 336), which are suitable for sewage or surface water conduits; in the more expensive circular shape, or they may be oval in form.

They are usually divided into two classes, according to depth, and are spoken of as 'shallow' or 'deep' manholes, as the case may be (see Figs. 24 and 25, pp. 336 and 337).

Where the separate system of drainage is in force, a combined manhole is sometimes constructed, as shown in Fig. 16, in order to save the additional expense of a separate manhole for each conduit. Access is obtained to the surface water conduit, which is shown on the right-hand side of the sewer, by means of a sliding door. Special provision has, however, to be made to



PLAN OF COMBINED MANHOLE

SECTION A–B

Fig. 16.

prevent the sewer gas getting into the surface water conduit, and this is done by means of an air-tight movable door. The cost may be somewhat reduced by this mode of procedure, but the work is, nevertheless, carried out at a disadvantage under the combined arrangement, and the general result can scarcely be regarded as altogether satisfactory.

The covers of sewage manholes are now generally made solid, and the ventilation provided for by means of a column connected with the manhole at the head, or at the end of each straight length of sewer. Those for the surface-water manholes are of the ventilating type, and are generally fitted with a dirt box as shown in Fig. 21 (see p. 334).

In all cases the requirements of the Local Authorities should be carefully studied, and the details arranged in accordance therewith. The work of forming the junction of the new with the existing main sewer is often carried out by the Local Authorities under a special arrangement with the estate owner. In any case provision should be made that these junctions are not to be formed at right angles with the existing sewer.

Cost of Manholes.—The average cost of sewage or surface water manholes may be approximately given as follows :—

	Per ft. of depth.
Sewer manholes with 9-in. concrete foundations, and solid cover and frame, as per specification	28*s.*–32*s.*
Surface water do. with ventilating cover as per specification	30*s.*–32*s.*
Combined do. (see Fig. 16)	40*s.*–45*s.*

Ventilating Shafts.—Under the Public Health Act, 1875, every Local Authority is made responsible for causing their sewers to be ventilated so as not to be a nuisance, or injurious to health. A really effective and satisfactory method of discharging this liability has yet to be discovered, but in the meanwhile the idea of fixing iron columns from 30 to 35 feet in height, with conduits connected with the manholes, at the highest and intermediate points of sewers, as outlets, is favoured in many localities (see Fig. 22). The cost of the column shown in the illustration, including fixing in block of concrete, was £14 10*s.*; while the inspection chamber connected therewith, together with cover and frame, entailed an additional expenditure of about £2 10*s.*

Gulleys.—These are fixed at the sides of the streets, in connection with the channels, to conduct the surface water into the sewer proper, or, where the separate system of drainage is adopted, into the surface water sewer under the street. They should be fixed where-ever there is a change of gradient, and at other intermediate points where necessary, as well as at the junctions of roads, but in such a manner as to allow of each road disposing of its own surface water, and in no case should they be more than 50 yards apart.

A great number of different forms of gulleys have been introduced from time to time, the principal objects aimed at being, (1) the capacity to carry off heavy rainfalls while preventing the road detritus being taken into the sewer; (2) a form of surface grating that will not interfere with the traffic, and that will not be readily choked with leaves or other road refuse; (3) the gulley pit to form an effectual trap to prevent the escape of gas, yet to be capable of being easily cleaned out. In Fig. 23 is given a form of gulley that is regarded with much favour in the London suburb. The cost of this stoneware gulley, 18 in. diameter and

4 ft. deep, with gulley frame 22 in. × 16 in. × 6 in., including excavation and concrete surround, is about £4 10*s*. each. A cast-iron trapped gulley frame and tank 27 in. × 16½ in. and 34 in. deep can be provided and fixed for £4 10*s*. to £5 10*s*. each, or with open-mouth side gratings to let in flush with the kerb for storm overflows, at an additional cost of about 25*s*. each.

Culverts.—These consist of two kinds known as 'Box' or 'Arched,' and 'Pipe' culverts. The use of culverts is restricted as much as possible on account of their expense, but wherever natural drainage channels, carrying any appreciable quantity of water, intersect the line of a new road, culverts will generally be necessary for the disposal of the water. Pipe-culverts, however, are generally sufficient for this purpose, except where the quantity of water to be dealt with is unusually large. These may be constructed either of glazed sewer-pipes, or of iron water-pipes. They should be carefully laid, so that the pipes are well supported below; while special care should be taken to make the joints water-tight, in order to prevent any leakage which would tend to undermine the bedding and cause settlement and ultimate fracture. The outfall should be set in masonry, to protect the face of the embankment from wash.

The size of the culvert will depend upon the quantity of water to be disposed of, but while making full allowance for any increase in the flow during wet seasons it should not be forgotten that there is an advantage in using the smallest pipes consistent with efficiency, not only on account of their smaller cost, but also of the saving of labour in laying them.

FOOTPATHS.

Methods of Formation.—In dealing with the formation of footpaths regard should, of course, be paid to the kind of surface covering that will eventually be adopted for their completion. As a rule, however, the bottoming of footpaths may be temporarily formed of gravel, cinders or ballast, and the surface laid with good binding gravel, granite, or other hard stone or quarry chippings. This kind of formation is suitable where the paths are to be finished with tar paving, Yorkshire flagging, or similar materials, but in the case of natural asphalte (mastic), brick, or concrete paving with slabs, a concrete foundation is usually laid.

Although gravelled footpaths offer certain advantages in regard to first cost, they cannot be considered economical. The material becomes loose in dry weather, and is constantly being washed or kicked off the path. Moreover, the loose stones render such paths very disagreeable to the pedestrian. To remedy this somewhat unsatisfactory state of things, tar paving was introduced, and which, although rather expensive, is decidedly more comfortable to walk on. If well laid, tar pavement will often last for twenty years. Its surface, however, is apt to wear unevenly, and it is not easy to repair. In very hot weather it sometimes becomes rather sticky or soft.

Stone flagging offers many advantages, amongst which may be mentioned its imperviousness to wet; it affords an effective and pleasant foothold; it dries quickly after rain; it is fairly durable, pleasing in appearance, and clean. The principal objections to the use of stone flagging are its first cost, which is high compared with its durability; the variation in degrees of hardness of different parts of the slabs, whereby the softer portions often wear down in pits and thus allow the rain-water to pool on the surface.

Taken in order of cost, the different kinds of footpaths, that may be adopted on estates undergoing development, may be classified as follows:—

1. Gravel, cinder, or chippings.
2. Gravel, cinder, or chippings with surface tarred and sprinkled with stone dust or fine chippings.
3. Tar concrete centre with gravelled side margins.
4. Tar concrete or tar paving.
5. Flagging.

Foundation.—The rules that apply to the formation of a good foundation for a macadamised road are also applicable to footpaths. It is very desirable that a good foundation should be laid, whatever material may be used for the surface covering. In ordinary cases of estate development a hardcore bottom will be found to meet the requirements, but the bed should be excavated or made up, as the case may be, from 4 to 9 inches below the finished surface of the footpath, well rolled, and provision made for its drainage. The depth of the foundation-bed of material will be governed, in a large measure, by the nature of the subsoil, but 4 to 6 inches is generally regarded as being sufficient on clay subsoils for good class work, while on a firm gravel or chalk substratum the depth may be reduced to 3 inches, or even less.

Width.—The width of the footpath, as compared with that of the roadway, should be in about the same ratio as the accommodation required by the pedestrian and vehicular traffic, respectively. The dimensions suggested in the Model Bye-laws are that, for 36-feet roads, the width of each footpath shall be not less than one-sixth of the entire width of the street, thus reserving one-third of the entire width for footpaths, and allowing two-thirds for the carriage-way.

In districts where new streets have to be made at least 40 feet in width, the bye-laws generally provide that the footpath on each side shall be not less than one-fifth of the entire width of the street. For a total width of 40 feet this would give 8 feet for each of the two footpaths, and 24 feet for the carriage-way.

Slope.—Provision is also made in the Model Bye-laws that the footpath ‘ shall slope or fall towards the kerb or outer edge at the rate of ½ in. in every foot of width if the footway be not paved, flagged, or asphalted.’ In practice a slope of about ½ in. to the foot is generally given for gravelled footpaths, and ¼ in. to the foot for paved or asphalted footpaths.

The method of formation described on the preceding page is that generally adopted in the Metropolitan suburbs, and is suitable either for a surface covering of stone, flags, or tar paving.

Footpaths connected with private roads are sometimes made of barrelled shape, as this form is considered to be more enduring, and to look better than a hanging path. In such cases 2-in. land-drain pipes should be laid along each side of the foundation level, when in excavation, and connected with the gulley pit.

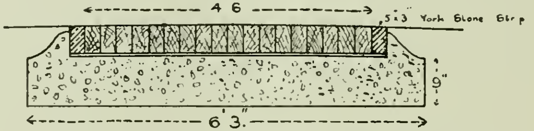
Cost.—The cost in each case will depend largely on the extent to which local materials can be utilised. It may also be regulated, as in the case of carriage-ways, to meet a limited expenditure of capital. If carried out on the lines indicated, the approximate cost will be somewhat as follows :—

	Per square yard.
(1) Footpaths formed of gravel, cinder, or chippings, with 4 in. of bottoming and 2 in. of surface material, including excavating and rolling, from	1*s.* 6*d.* to 2*s.* 6*d.*
Do. with 6 in. of bottoming and 3 in. of surface material	2*s.* 6*d.* to 3*s.* 6*d.*
(2) Do., do., with surface tarred and sprinkled with stone dust or fine chippings, including excavating and foundations as before, according to the depth of foundation	2*s* 0*d.* to 4*s.* 0*d.*
(3) Do. with tar concrete centre and gravelled side margins, according to the width of tar paving	2*s.* 0*d.* to 4*s.* 0*d.*
(4) Tar concrete or tar paving, consisting of limestone chippings or broken Kentish rag screened through sieves of 1¼ in., ¾ in., ½ in., and ¼ in. meshes, heated and mixed with 12 gallons of tar, ½ cwt. of pitch, and 2 gallons of creosote to each ton of screened materials, properly laid, the larger stones being placed at the bottom and dressed over with fine grit or stone dust, and rolled in with a 10-cwt. roller :—	
2 in. thick	1*s.* 0*d.* to 1*s.* 6*d.*
3 ,, ,,	1*s.* 3*d.* to 1*s.* 9*d.*
4 ,, ,,	1*s.* 6*d.* to 2*s.* 0*d.*
(5) Flagging 2½ in. thick, properly laid in blue lias lime and sand (or cement and sand) mortar, and bedded in sand on a 4-in. hard gravel, brick rubbish, or ballast bed	6*s.* 0*d.* to 7*s.* 6*d.*

Other kinds of paving include natural asphalte (mastic), concrete in monolith or slabs, stone setts, bricks, or tiles. These, however, are, generally speaking, very expensive, and being seldom used except in towns where there is a very heavy traffic, are somewhat outside the scope of this treatise.

Crossings.—These are formed from 3 ft. 6 in. to 6 feet in width with granite setts or cubes laid on a bed of concrete and grouted with cement mortar, in a similar manner to that hereafter described for the channelling (see p. 211). They are laid to the finished contour of the roadway, or to such falls as may be required, at the junction of two or more roadways. Where the flow of channel water will not be interrupted it is an advantage to pedestrians for the inner edge of the channel to be laid level with the kerb and tilted outwards towards the crossing.

An agreeable and fairly durable crossing may be formed with wood blocks, a bed of cement-concrete being floated over with cement-mortar and creosoted fir blocks 9 in. × 3 in. × 5 in. deep (or 9 in. × 3 in. × 6 in. deep) are laid with the end grain uppermost, and ¼ in. parting slips 3 in. high jointed with pitch and creosote and grouted with cement and lime-washed pebbles. The wood paving should be bounded on each side by 5 in. × 3 in. hard York tooled strips not less than 3 feet in length, held up from the concrete bed by a backing of concrete (see Fig. 17).



SECTION OF WOOD BLOCK CROSSING.

Fig. 17.

Kerbing and Channelling.—Where properties are developed by means of so-called 'builders' roads,' the work of laying the kerbing and channelling is generally left until the roads are made up to be taken over by the Local Authorities. The owner is thus able to minimise the original outlay on road formation, although the cost of completing the thoroughfares will, of course, be proportionately increased.

The Model Bye-laws (IV. New Streets and Buildings) provide that the footways of new streets shall be constructed so that the height of the kerb, or outer edge of such footway above the channel of the roadway, shall be not less than 3 inches at the highest part of such channel, and not more than 7 inches at the lowest part (see Figs. 5 and 18). The London Building Act provides that the kerb shall not be less than 4 inches or more than 8 inches above the said channels.

These requirements are more or less amplified in local bye-laws. In the Metropolitan suburbs provision is generally made that the kerb shall be of granite or other suitable material, to be properly dressed and laid on a bed of concrete, or of Norwegian granite slabs set to tilt in cement mortar, properly grouted in cement, and laid on a bed of concrete.

The principal objects of the kerb and channel are to raise and retain in position the materials forming the footpath as well as the carriage-way, whilst at the same time constituting an effective line of division between the two; also to afford the necessary means of surface drainage for both carriage and footways.

Kerbs.—The materials usually employed for kerbing are Leicestershire, Norwegian, or the syenitic granites. Guernsey granite can only be obtained in comparatively short lengths, and is apt to wear slippery. In some districts sandstone is used, and occasionally the kerbs are formed from vitrified fire-clay blocks, cement concrete, or cast or wrought iron. For streets intended for much traffic granite kerbs are generally employed, more especially on gradients where carmen are likely to 'hug' the kerb, and thus subject it to the grinding action from the wheels of their heavy vehicles. To minimise the effects of such usage, the front of the kerb is splayed off, as shown in section in Fig. 18. Although less durable than Aberdeen or Guernsey granite, that obtained from Norway is rather less expensive, and consequently is now largely used for ordinary suburban roads.

The dimensions as well as the methods of laying vary in different districts. When laid flat on a 4–6 in. bed of concrete, the kerbs are usually 6 in. × 12 in., or 8 in. × 12 in. When laid on edge, concrete is not necessary unless the foundation be bad. The sizes may be either 5 in. × 10 in., 6 in. × 10 in., 5 in. × 12 in., or 6 in. × 12 in. When set on edge the kerb should rest on a good bed of gravel, and be beaten into place with a heavy beetle, the filling on the channel side being well rammed with an iron bar to firmly set the kerb in an upright position. When properly laid in this way the kerb is less liable to be displaced than a flat kerb, and it permits of the lamp columns being fixed nearer the channel.

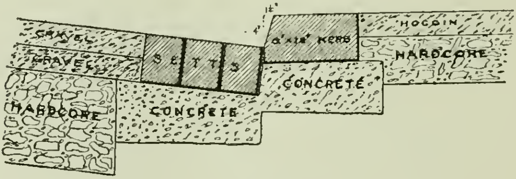


Fig. 18.

Granite kerb should be drafted about 1 in. along both top edges, and hammer-dressed about 5 in. on the face, so that there may be a smooth surface visible against the channel. For the sake of appearance the whole of the visible surface should be hammer-dressed, the top being bevelled off to conform to the slope of the footway. The kerb should be laid in lengths of not less than 3 feet.

Laying Kerbs.—Both care and skill are needed in laying the lines of kerbing, in order to secure uniform longitudinal gradients that will bone correctly from point to point. It requires to be carefully and well bedded with close butt joints, and with a fall of about $\frac{3}{8}$ in. outwards towards the channel.

The circular kerbing to be laid at the junctions of streets should be accurately worked in accordance with the curves shown on the plans, and have radiated joints.

Channels.—In the case of paved streets, the channels are generally constructed of the same materials as are used for the roadway, but the setts are placed longitudinally instead of transversely so as to aid the flow of water in the channel. The channel should be from 12 to 18 in. in width, and should have a fall of 1 in 50–100, but, in any case, not less than 1 in 250 for setts, or 1 in 300 for slab channelling. The setts are laid upon a 4-in. or 6-in. bed of concrete, and grouted in cement. Granite slabs suitable for channelling are usually made from Norwegian or Leicestershire granite, 12 in., 15 in., or 18 in. wide, and from 3 in. to 6 in. thick. They are hammer-dressed on the surface, and their ends should be carefully dressed so that they butt closely together for their full depth, otherwise they are liable to tip under heavy loads. The slabs should be laid on a concrete foundation tilted towards the kerb, and the butt joints, and the joint between kerb and channel, should be well grouted in cement-mortar, after the road rolling has been completed.

Cost.—Granite setts vary in size and in price, per ton, as shown approximately in the following statement :—

	3 in. × 6 in.		4 in. × 6 in.		5 in. × 6 in.		Carriage to London terminus extra.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
Mount Sorrel . .	22	0	18	6	17	6	6	3
Stoney Stanton	21	0	18	0	17	0	5	6
Enderby . .	22	0	19	3	18	3	5	6
Guernsey . .	23	0	19	0	18	0	4	0

A ton of setts will cover an area of $3\frac{1}{2}$ to 4 square yards.

The cost of kerbing and channelling is largely influenced by the distance of the site from quarries, as well as by the kind of material employed, but the following may be regarded as the approximate prices in the Metropolitan districts :—

	Per lineal yard.
Leicestershire granite kerb 12 in. × 6 in. straight, laid flat, but exclusive of foundation	5*s.* 6*d.* to 6*s.* 0*d.*
Do. do. curved, do	6*s.* 6*d.* to 7*s.* 6*d.*
Norwegian do., straight, do., including 6-in. bed of concrete	6*s.* 0*d.* to 6*s.* 6*d.*
Limestone kerb, 12 in. × 5 in. straight, set on edge	3*s.* 3*d.* to 3*s.* 9*d.*
Leicestershire channelling, consisting of 3 courses of 5 in. × 6 in. setts . .	3*s.* 9*d.* to 4*s.* 0*d.*
Leicestershire channelling, consisting of 3 courses of 5 in. × 6 in. setts, with 6-in. concrete foundation . .	5*s.* 0*d.* to 5*s.* 6*d.*
Norwegian granite slabs, 12 in. × 6-in., set in cement mortar on 6-in. bed of concrete	6*s.* 0*d.* to 7*s.* 0*d.*
Limestone channel slabs, 12 in. × 6 in., laid flat	3*s.* 6*d.* to 4*s.* 0*d.*
Sandstone channel slabs, 12 in. × 4 in., laid flat, including 4-in. concrete foundation	5*s.* 0*d.* to 5*s.* 6*d.*

In some districts where a high standard of finish is not required, an appreciable reduction in the cost may be effected by using 'undressed' granite for the kerbs. If 10 in. × 5 in. kerbing of this kind be set on edge, without any concrete foundation, the cost need not exceed 2*s.* to 2*s.* 6*d.* per lineal yard, but such kerbing would not, of course, present a very finished appearance.

The specific gravity of different granites varies somewhat, but the number of lineal feet of kerbing contained in a ton may be approximately estimated as follows :—

12 in. × 6 in. kerbing, 27 to 28 feet, per ton.
12 in. × 8 in. kerbing, 19 to 20 feet, per ton.

Average Cost of Formation of Roads.—In the following statement is given a general summary of the approximate average cost, *per lineal yard,* of the formation of an ordinary suburban road, as more fully described in the specification given hereafter (see p. 259), and shown in Figs. 5 and 6 :—

					Drainage.		
Description.	Width.	Carriage-way.	Gravel foot-path.	Kerbing and channelling.	Separate.	Combined.	Total cost.
		s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	£ *s.* £ *s.*
Macadamised road	36 feet	30 0	5 0	10 0	25 0	15 0	3 0 to 3 10
,,	40 ,,	35 0	6 0	10 0	25 0	15 0	3 6 — 3 16
,,	45 ,,	40 0	7 0	10 6	25 0	15 0	3 12 — 4 2
,,	50 ,,	46 0	8 0	11 0	25 0	15 0	4 0 — 4 10

Where a less expensive road is required for private estates, it may be formed with a foundation of 6 in. of hardcore with 3 in. of metalling broken to 1½-in. gauge, and a topping of 1 in. of gravel, each layer to be well rolled. The outlay necessary for the formation of a road on these lines, but exclusive of footpaths, sewers, and surface-water drains, would be approximately as follows:

Road 24 feet wide, 20*s.* 0*d.* to 24*s.* 0*d.* per lineal yard.
Road 30 feet wide, 25*s.* 0*d.* to 30*s.* 0*d.* per lineal yard.

'Making Up' of New Streets and Roads.

Powers of Local Authorities.—The work of making up a new road is usually carried out by the Local Authorities, as soon as a sufficient number of houses has been built and occupied, or arrangements have been made with the Authorities for that purpose. This work might be done by the original estate owner, or other parties who are sufficiently interested in the property, but it is nevertheless desirable that the requirements should be carried out by the Authorities, if for no other reasons than that they cannot reasonably refuse afterwards to take over the road because the work has not been properly executed, and because of the special powers which they possess for apportioning the costs among the frontagers, and of enforcing payment.

Mode of Procedure.—In cases where a rough 'builders' road' has been utilised in the development, and only the sewers have been laid, the work of 'making up' will consist of preparing the road-bed, forming the foundation, and laying the intermediate and surface coats of material, in a similar manner to that described in the specification given hereafter (see p. 259); but, where the road has been properly formed, the ultimate 'making up' will be materially lessened. In the latter case it will probably be sufficient to score over, or scarify the surface of the carriage-away, where required, and then to cover the surface with 3–6 in. of granite or flints, the bottom layer to be of 2–2½-in. material, and the upper layer 1½ in. These coatings are to be well rolled and consolidated, and the surface of the carriage-way finished to a proper camber.

The footways will require to be paved with flagging or tar paving, as the case may be, the flagging being laid with a proper slope and well bedded in mortar (see p. 204). For each carriage entrance a pitched crossing will be required, and which may be formed with granite setts or cubes, in a similar manner to that already described for road crossings (see p. 208), or they may be laid with blue fluted carriage-way paving bricks. It is not likely that much will require to be done to the kerbing, channelling, manholes, or gulleys. Where the lighting has not been provided for, lamp columns for electricity or gas will have to be fixed.

Cost of Making up.—The cost of such making up may be approximately estimated as follows :—

	s. d.		*s. d.*			
36 ft. road	4 0	to	5 0	per foot	frontage, on	each side.
40 ft. ,,	5 0	to	6 6	,,	,,	,,
45 ft. ,,	6 6	to	8 0	,,	,,	,,
50 ft. ,,	7 6	to	10 0	,,	,,	,,

Where roads have to be formed as well as made up, the cost to be apportioned among the frontagers will probably be somewhat as follows :—

	s. d.		*s. d.*			
36 ft. road	10 0	to	12 6	per foot	frontage, on	each side.
40 ft. ,,	12 6	to	15 0	,,	,,	,,
45 ft. ,,	15 0	to	17 6	,,	,,	,,
50 ft. ,,	17 6	to	21 0	,,	,,	,,

Tar Macadam Surface.—If the roads are likely to be subjected to much motor traffic, it will be desirable for the surface to be laid with tar macadam. When properly prepared this tar macadam or bituminous concrete materially reduces the dust as well as the noise of the traffic, and renders the road surface almost impervious to moisture, and consequently more sanitary than the ordinary macadam. It is not, however, suitable for gradients steeper than 1 in 20, on account of its slippery surface after wear.

Method of Laying.—Various methods of preparing and laying tar macadam are in practice in different districts, but that recommended by Boulnois may well be adopted where first cost does not form the chief consideration. He describes the *modus operandi* as follows :—

'The material to be used may be the ordinary local road metal broken to three sizes, viz. 2½-in. gauge, 1½-in. gauge, and ¾-in. gauge. These are heated on an iron floor, under which are flues from a fire, until all the moisture is driven out of each piece of stone. The material is then mixed in its heated state with a sufficient quantity of a mixture (also in the heated state) of pitch, tar, and creosote oil boiled until they form a thick and tough consistency ; the stone and mixture are thoroughly incorporated together by frequent turnings until each particle of stone is thoroughly coated and even slightly impregnated with the tar mixture. The quantity of the tar, pitch, &c., depends on the quality of these articles, especially that of the tar, which frequently varies ; a good average may be, however, taken as follows :—

12 gallons of tar,
½ cwt. of pitch,
2 gallons of creosote oil,
1 ton of stone.

'The longer the treated stone is allowed to remain before being put on the road the better, but it is well in this case to again treat it with some of the mixture before taking it to the road.

'The road-bed and foundation are prepared in a similar manner to that for an ordinary macadamised roadway, and the tarred macadam is laid down as follows:—The first layer is made with the 2½-in. metal, about 3 in. thick, and well rolled with a 15-ton roller; upon this is laid the 1½-in. metal, about 2 in. thick, also well rolled, and the top coat is made with the ¾-in. metal about 1 in. in thickness, sprinkled over with sharp sand or grit, and thoroughly well rolled and consolidated.[1]

'*Cost.*—The cost of this work varies with the price of materials in different localities from 2*s.* to 3*s.* per square yard, exclusive of the cost of foundations.'[1]

It will be seen that the foregoing method adds materially to the cost of completing the surface of a road, and numerous experiments are at the present time being carried out with a view of ascertaining the best and most economical way of forming a strong and dustless surface. The general opinion at the International Road Conference seemed to favour the painting of macadamised road surfaces with heated tar, using about one gallon of tar to every 6 superficial yards of surface, as yielding the best results, having regard to the cost of the dressing. This method entails an outlay of about 1½*d.* to 2*d.* per square yard, including the subsequent sanding, of the surface treated.

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[1] *The Municipal and Sanitary Engineers' Handbook.*

CHAPTER VIII

VALUATIONS

Different kinds of Estimates.—Among the more important valuations connected with the development of building estates are those required for the purposes of sale or purchase, mortgage, estate duty, enfranchisement or parochial assessment. It is not improbable that the valuation of such properties for the assessment of the proposed duties on land values may also have to be added to this list on an early date. These valuations may apply to (1) the land only, (2) the buildings standing on the land, or (3), the land with the buildings.

In estimating the value of uncovered or partially-covered building land, due regard should be paid to the several matters to which attention has been drawn in previous chapters, and which may here be briefly summarised as follows :—The tenure under which the property is held, whether freehold, copyhold, or leasehold ; its situation ; boundaries ; rights of way and other easements ; drainage facilities ; nature of existing tenancies ; present returns ; outgoings ; general qualifications and capabilities of development ; cost of roadmaking and sewering ; present stage of ripeness, and length of time required for development.

Definitions of 'Value.'—The special purpose which the valuation is intended to serve should also be borne in mind, as the term 'value' has different significations according to the circumstances in which it is used. Thus, there may be the *value*, to an owner, of a property to be taken by compulsory purchase; there is the *value* of a building estate to be acquired by a newly-formed company or syndicate as a 'going concern'; there is the *current market value*, which may be proportionately high, if immediate advantage can be taken of an extraordinary demand, or equally low in case of depression in the building trade; and there is the *sacrificial value*, generally the lowest of all, obtainable under a forced sale. Properties enjoying certain advantages of position may also be said to possess either a 'special value,' as, for instance, when a property has become essential to the improvement of a town and must necessarily be acquired by the authorities; a 'competitive value' when its development dominates that of adjoining properties belonging to rival speculators; or a 'compulsory sale value' where it will be required for the purpose of certain public undertakings, such as railways, &c.

There is often a wide difference between the figures applicable to the several values above indicated, and in order to arrive at a correct estimate it is, therefore, necessary that the capabilities and potentialities of the estate should be judiciously appreciated in conjunction with the special object of the valuation.

For the purposes of this treatise it is proposed to classify the principal matters that call for consideration, in estimating the value of building properties, under the following headings:—

I. The outlay necessary for development;

II. The length of time required for completion of the scheme ;
III. The returns obtainable during development ;
IV. The estimated value of the sites.

I.—The Outlay Necessary for Development.

Plans.—The expenditure which the development of a property will entail will include, in the first place, the cost of preparing a large scale plan of the property, and the formulation of a comprehensive development scheme. No general rule can be laid down for estimating the cost of this work, as a great deal will depend on the surface configuration of the estate. It may possess either a gently undulating surface affording exceptional facilities in regard to road formation and drainage, or an irregular contour which bristles with difficulties. Moreover, the work is often made 'part and parcel' of an arrangement whereby the subsequent plot sales and ground rental lettings are placed in the surveyor's hands. Taken independently, however, the cost may vary from £2 to £5, per acre, according to the physical character of the property, and the relative position of the existing roads and sewers.

Sales or Lettings.—The further cost of letting or selling the plots during the course of development may be estimated in round figures at 5 per cent. on the gross capital value, assuming that the usual payments will be borne by the owner, namely, one year's rent in respect of all ground rental lettings, and a commission on sales at the rate of 5 per cent. on the first £100, and 2½ per cent. on the residue of the purchase money.

Road Formation.—The next item to be considered will be the probable cost of road formation. In order to form a reliable estimate of the expenditure that will be required in this direction the surveyor will necessarily have to consider how the property can best be dealt with, or, in other words, he will have to formulate a preliminary scheme of development on similar lines to that which we have already described in Chapter III.

Having carefully studied the requirements of the Local Authorities, the surveyor will be in a position to determine the lines of the principal and subsidiary roads so that their length can be ascertained. In estimating the average cost, per lineal foot, or yard of road formation, attention will be given to any cuttings or embankments that may have to be made, and also to the utilisation of any suitable materials to be found on the property, or that may be obtainable in the locality.

Sewers.—The expenditure on sewers will depend in no small measure on the method of sewerage (whether separate or combined) adopted in the district; the depth of the existing sewers; and the facilities which the natural surface configuration offer for connecting the drainage of the property with such sewers.

For details of the general cost of road formation and the construction of sewers, the reader is referred to Chapter VII., but the figures will of course require to be carefully modified to meet the special requirements of each particular case. If the property is of copyhold tenure, or is subject to the payment of land tax or tithe, the cost of enfranchisement, or of redemption, should, for the reasons already given, be taken into account (see pp. 19–29).

Interest.—Interest should, of course, be charged on the outlay required in respect of each of the items referred to as from the date of payment, as well as on the purchase price of the property. In practice, however, the interest is often merged in the gross profits of the undertaking, i.e. the balance which remains after the total amount of actual payments has been deducted from the receipts.

II.—The Length of Time required for Completion of the Scheme.

Importance of Forecast.—The period that will be required for the development of a comparatively small block of ripe building land may often be determined with precision, and without much difficulty, but where an estate includes blocks of land in varying stages of ripeness, the task affords scope for the application of matured judgment and foresight. The worth of the valuation will, however, depend in no small measure upon the accuracy of this forecast.

The development may proceed at a uniform rate throughout, it may commence at a rapid rate and gradually slacken, or have to be suspended for a time, or it may commence slowly and acquire more rapid movement in the later stages. In estimating the period that will be required, the surveyor will probably make himself acquainted with the rate of increase, during recent years, in the population of the town that dominates the situation (see Chap. II.), and will note the number of houses that have been built, and that are in course of construction, to meet the requirements of such increase. He will also satisfy himself as to whether any ‘over-building’ has taken place in the locality during recent years, and as to the period of stagnation that ensued. In gauging the prospective accommodation that will be needed, any probabilities of abnormal extension of the town by means of the opening of additional lines of communication such as railways, tramways or docks, or the establishments of new factories or works will be appreciated, together with any special facilities that the estate may offer in connection with such future development. If, on account of advantages of situation or natural qualifications, other land is found to be more eligible, a proportionate allowance would have to be made in the development period. The direction in which the town is extending may also have an important bearing on the enterprise, as there will be a decided tendency to continue along the same lines until it is realised that greater advantages are obtainable in other directions. Whilst being eligible for the erection of small-class dwellings forthwith, the property may also possess prospective qualifications for development, at greater pecuniary advantage, as sites for good class residences within a limited period. These and other incidental matters may necessarily have to be considered by the valuer before proceeding to assign a time-limit to each of the several blocks comprised in the estate.

III.—The Returns obtainable during Development.

Rents.—These will consist of rents payable in respect of the land whilst it can be let for accommodation, market gardening, or other special purposes, as more fully described in a previous chapter (see p. 7).

As such tenancies have necessarily to be subject to determination at short notice, the tenants are deprived of the requisite security for effecting improvements of a lasting nature, and the rental value is thus somewhat diminished. As the development proceeds, however, the demand for small plots for gardens and allotments, school playing grounds, &c., increases, and although such small lettings are somewhat troublesome to deal with, they may often be made very remunerative under judicious management.

The rental value of accommodation land varies from about £2 to £5 per acre, where the holdings are not less than ten acres in extent, and a proportionately higher figure is usually paid for smaller areas.

IV.—Estimated Value of Sites.

Dominant Factors.—As with other kinds of real property, the method adopted for making a valuation of a building estate is similar in principle to that followed for agricultural land. In each case consideration must be given to—

(1) The annual returns obtainable ;

(2) The capitalised value of those returns.

In the case of agricultural land the annual value of the returns will largely depend on the fertility of the soil, but with a building property the surface configuration will be of greater importance than its fertilising qualifications. Although in each case the returns may be obtainable from a so-called crop, there is such a wide difference between a crop of houses and one of agricultural produce, that a totally different principle has to be adopted in assessing their respective values.

'The richest crop for any field,
Is a crop of bricks for it to yield.
The richest crop that it can grow,
Is a crop of houses in a row.'

The value of the house-crop will, however, vary according to its kind, the nett returns, per acre, being generally in proportion to the class of house erected, i.e. the sites devoted to the smallest type of workmen's dwellings will yield the lowest return, while those utilised for first-class residences will give the highest value. The fact that satisfactory accommodation cannot be provided for the families of ordinary working men, except at a loss, where the requirements of the Model Bye-laws have to be adhered to, has been proved in the case of the model villages of Port Sunlight and Bournville, as well as in other developments of a similar nature. To be successful such ventures have necessarily to be, in some measure, philanthropic, and they cannot therefore be regarded, *per se*, as forming sound dividend paying concerns from a strictly financial point of view. The same remarks are also applicable in the case of the sites acquired by the London County Council for the provision of workmen's dwellings, and in respect of which it has been found necessary to write down a sum of over one million pounds to cover the loss incurred in dealing with the matter.

Ground Rent.—The rental value of a building site is generally considered to be the difference between a reasonable return on the cost of erecting a suitable house upon it, and the aggregate rental (less outgoings) which the property will yield in its entirety after the house has been completed. Suppose, for example, a house which cost £2,000 to build, and occupies a site of one quarter-of-an-acre, lets at £200 per annum on a repairing lease, the value of the land might be computed as follows :—

	£
Interest on building outlay at 7 per cent ..	140
Renewals at $7\frac{1}{2}$ per cent, on rent of £200 ..	15
Risks, collection, &c. at 5 per cent.	10
Balance or rental value of site	35
Aggregate gross rental value ..	£200

Taking the annual value of the site as £35, and capitalising this sum on the 4 per cent. table, or twenty-five years' purchase, gives £875 as the capital value of the site, on the assumption that the ground rent has been secured, and which is equal to £3500 per acre.

According to Gwilt : ' The value of town or city property, which consists principally of buildings, is divisible into two parts : namely, that arising from the value of the soil or site, and that which arises from the value of the buildings placed upon it. We will suppose, for a house which is fairly let at a rent of £100 per annum, no matter what the situation of it be, that it could be built for £1000 and that the proprietor or builder would be content with 7 per cent. for the outlay of his money, a rate by no means larger than he would be entitled to claim, seeing that the letting, after it is built, is a matter of speculation, and that loss of tenants and other casualties may temporarily deprive him of his capital ; then the rent of the mere building would be £70, and as the full rent is £100, £100 — 70 = £30, which is manifestly the value of the ground or ground rent. Thus in cases of valuation of freeholds, wherein the gross rent can be accurately ascertained, there can be no difficulty in arriving at the real value of the ground rent, because the building-rent, or that arising from the expenditure of the money on the soil, can be immediately ascertained by the architect, with the rate of interest on it which it is fit the builders should have. The remainder of the rent is that inseparably attached to the value of the soil, and belongs to the ground landlord. The *reason* for thus separating the two rents is this: the ground rent, attached as it is to the soil, is imperishable; the other portion of the value of house property is strictly the result of the perishable part of it—namely, the buildings itself—and this is limited by the durability of the building, which has great relation to the time it has already existed, and to the substantiality with which it has been constructed. The durability, then, or the number of years a building will continue to realise the rent, is the second ingredient in a valuation, and is a point upon which none but an experienced person can properly decide. The rate of interest which the buyer is content to obtain in the investment of his money in buildings, or, in other words, in the purchase of the perishable annuity from the building, will necessarily vary with the value of money in the market.'

In the foregoing example the estimate of ground rental value—though relatively large—is deduced from the letting value of the existing structure and site combined. It is assumed that the structure is suitable for the site, but where, as in the well-known case of Holland House and Park, the present rack rental does not nearly represent the value of the land if fully used, the estimate must necessarily be based on the sum obtainable for the property as a cleared site.

In practice, the ground rental value of a site is generally determined before the house is erected, and under ordinary circumstances the estimate is based on the rent which would be obtainable for the land under a building lease, in the usual form, and without any fine or restriction other than the usual building covenants. Where rights of adjoining properties to light and air, or other easements have to be considered, or where restrictive covenants are particularly onerous, the question of the ground rental or site value becomes very complicated, and may give rise to a wide difference of opinion.

Site Values.—The method of fixing the value of building land varies in different parts of the kingdom. In the Metropolitan district it is generally taken at a certain sum, per lineal foot, of road frontage, but in the Midlands the price is usually fixed at per square yard. In many parts of Lancashire and other northern counties, the square foot of superficial area forms the common basis of calculation. The price quoted on either of these bases for uncovered sites, may be either that representing the *annual* or the *capital* value, respectively, the latter being in such cases calculated on a 5 per cent. basis, or twenty years' purchase of the annual value. Thus, the annual rent of 5*s.* per foot, building frontage, would be quoted as £5 per foot, frontage, for capital value; ¼*d.* per foot, super, annual value, would be 5*d.* per foot capital value; and 3*d.* per yard, super, annual value, would be quoted as 5*s.* per yard, super, for the capital value.

In the following table is shown the prospective capital value, per acre, of building plots of varying depths (irrespective of the area required for roads), the ground rents being fixed at per foot, of building frontage :—

Table I.—Capital Value, per acre, at 20 Years' Purchase.

Ground rent, per foot, of building frontage.		Plots 80 ft. deep.	Plots 100 ft. deep.	Plots 120 ft. deep.	Plots 150 ft. deep.	Plots 200 ft. deep.
s.	*d.*	£	£	£	£	£
1	0	544·5	435·6	363·	290·4	217·8
1	6	816·7	653·4	544·5	435·6	326·7
2	0	1,089·	871·2	726·	580·8	435·6
2	6	1,361·2	1,089·	907·5	726·	544·5
3	0	1,633·5	1,306·8	1,089·	871·2	653·4
3	6	1,905·7	1,524·6	1,270·5	1,016·4	762·3
4	0	2,178·	1,742·4	1,452·	1,161·6	871·2
4	6	2,450·2	1,960·2	1,633·5	1,306·8	980·1
5	0	2,722·5	2,178·	1,815·	1,452·	1,089·
5	6	2,994·7	2,395·8	1,996·5	1,597·2	1,197·9
6	0	3,267·	2,613·6	2,178·	1,742·4	1,306·8
6	6	3,539·2	2,831·4	2,359·5	1,887·6	1,415·7
7	0	3,811·5	3,049·2	2,541·	2,032·8	1,524·6
7	6	4,083·7	3,267·	2,722·5	2,178·	1,633·5
8	0	4,356·	3,484·8	2,904·	2,323·2	1,742·4
9	0	4,900·5	3,920·4	3,267·	2,613·6	1,960·2
10	0	5,445·	4,356·	3,630·	2,904·	2,178·

The approximate depths and frontages of an acre of building land are as follows :—

Depth.	Frontage.	Depth.	Frontage.	Depth.	Frontage.	Depth.	Frontage.
Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
20	2,178	120	363	220	198	320	136
30	1,452	130	335	230	189	340	128
40	1,089	140	311	240	181	360	121
50	871	150	290	250	174	380	114
60	726	160	272	260	167	400	109
70	622	170	256	270	161	450	97
80	545	180	242	280	155	500	87
90	484	190	229	290	150	550	79
100	436	200	218	300	145	600	73
110	396	210	207				

TABLE II.—SHOWS THE PROSPECTIVE CAPITAL VALUE OF BUILDING LAND ON THE BASIS OF THE GROUND RENT BEING FIXED AT PER SQUARE FOOT, OR SQUARE YARD OF AREA:—

Ground rent, per square foot.	Ground rent, per square yard.		Capital value at 20 years' purchase.		Capital value, per acre		
d.	*s.*	*d.*	*s.*	*d.*	£	*s.*	*d.*
$\frac{1}{36}$		$\frac{1}{4}$	0	5	100	16	8
$\frac{1}{18}$		$\frac{1}{2}$	0	10	201	13	4
$\frac{1}{12}$		$\frac{3}{4}$	1	3	302	10	0
$\frac{1}{9}$		1	1	8	403	6	8
$\frac{1}{6}$		$1\frac{1}{2}$	2	6	605	0	0
$\frac{2}{9}$		2	3	4	806	13	4
$\frac{1}{3}$		3	5	0	1,210	0	0
$\frac{4}{9}$		4	6	8	1,613	6	8
$\frac{5}{9}$		5	8	4	2,016	13	4
$\frac{2}{3}$		6	10	0	2,420	0	0
$\frac{7}{9}$		7	11	8	2,823	6	8
$\frac{8}{9}$		8	13	4	3,226	13	4
1		9	15	0	3,630	0	0
$1\frac{1}{9}$		10	16	8	4,033	6	8
$1\frac{2}{9}$		11	18	4	4,436	13	4
$1\frac{1}{3}$	1	0	£1		4,840	0	0

It will be observed that in the foregoing examples the ground rents have been capitalised on two different bases, one at twenty-five years' purchase, or at the rate of 4 per cent., and the other at twenty years purchase, or at the rate of 5 per cent. These rates are intended to indicate the difference between what are known as 'secured' ground rents, and those which are 'unsecured,' i.e. the higher number of years' purchase is applicable to ground rents which are actually payable in respect of leases that have been granted and houses built, whereas the lower multiplier is used for *estimated* ground rents.

Freehold Ground Rents.—Where the freeholder has let his land under lease for building purposes, subject to the payment of annual ground rents, the freeholders' interest consists of the ground rents payable during the period of the leases, together with the reversion to the properties at the end of that period. The sale of such a freeholder's interest would, therefore, be described as freehold ground rents with reversion.

Leasehold Ground Rents.—Where the freeholder lets a block of building land under lease, subject to the payment of a fixed rent, and the leaseholder sublets the land in plots under lease, and subject to a ground rent on each plot, the leaseholder's interest would be described as leasehold ground rents only, as they would be terminable, and would have no reversionary value.

Improved Ground Rents.—These are invariably leasehold ground rents, and are usually created by a freeholder letting a block of land under building lease, subject to the payment of a fixed ground rent, and the leaseholder sublets a portion of the land at the same ground rent, while the remainder is sublet at ground rents in excess of the sum payable to the freeholder. For example, if A, the freeholder, lets his land for £100 a year to B, and B sublets sufficient land for the sites of ten houses at a ground rent of £10 each. He sublets the remainder of the block at ground rents amounting to £50. The ground rents amounting to £100 comprised in the first subletting might be described as leasehold ground rents, those included in the subsequent letting, and amounting to £50, per annum, would be known as *improved ground rents*, but in neither case would there be any reversionary value attached to the leaseholder's interest (see Chap. III.).

GENERALLY.

Example of Market Value.—The valuation of a building estate may be completed by arranging the several items of expenditure and income in the form of a balance sheet, as shown in the following example, which is applicable to a property of twenty acres that is ripe for building operations. Having formulated a general scheme of development, the surveyor finds that about one-fourth, or some five acres of the land will be required for roads and waste spaces, thus leaving fifteen acres available for building purposes. The property is found to comprise the following frontages :—

	£	*s.*	*d.*
1,000 feet frontage @ 5*s.* per foot	250	0	0
1,500 feet frontage @ 4*s.* 6*d.* per foot ..	337	10	0
2,500 feet frontage @ 4*s.* per foot	500	0	0
Total estimated value of ground rents	£1,087	10	0

Capitalised on the 5 per cent. basis, or 20 years' purchase, shows gross value of property .. £21,750

Less :—

Expenditure on road formation with sewers, &c.

	£	
4,000 lineal feet of 45 ft. roads @ 25*s*. ..	5,000	
Legal and surveying costs incidental to purchase and laying out of property, but exclusive of charges for letting or selling plots	500	
Speculator's profit, covering interest on outlay and risk, estimated at 15 per cent. of gross value (say)	3,262	8,762
Present market value of estate		£12,988

In this comparatively simple example it has been assumed that the property is free from tithe and land tax, and that vacant possession may be had for immediate development.

Speculative Value.—If the valuation were required for the purpose of exploiting the property, the speculative element might be more fully appreciated, and the value might be computed as follows :—

	£
Sites for 26 detached houses estimated to produce a yearly ground rent of £7 10*s*. each ..	195
Sites for 55 semi-detached villas of £6 each ..	330
Sites for 120 smaller semi-detached houses of £4 each	480
Sites for 12 shops of £5 each	60
Site for 1 hotel	25
Estimated prospective value of ground rents, per annum	£1,090

		£
Capitalised on the 4 per cent. basis = 25 years' purchase (subject to deferred payment for 3 years until ground rents are secured), shows the prospective gross value as		27,250
Less :—	£	
Expenditure on roadmaking as before ..	5,000	
Legal and surveying costs, including one year's ground rent as commission on sale or letting of plots (say)	1,600	
Speculator's profit, covering interest and risk,[1] estimated at $\frac{1}{6}$th or $16\frac{2}{3}$ per cent. of gross value (say)	4,550	11,150
Prospective net value of estate when developed		£16,100

Theoretically, this estimate of profit should be based on the amount of the purchase price, plus expenditure on development. If the purchase price be therefore taken at £12,988, and the expenditure at £6600, or together £19,588, the allowance of £4550 would be nearly equal to one-fourth or twenty-five per cent. of such aggregate outlay.

Then the present value of the reversion to £16,100 at end of development, (say) 3 years, at 5 per cent.	£14,731

Comparison.—In this speculative estimate it will be seen that the present capital value (£14,731) is somewhat in excess of one-half of the prospective gross value of the property. This difference may seem to be a wide one, but in arriving at a general estimate of the present value of building properties that are ripe for development, the ratio of deduction most generally adopted for speculative purposes is that of one-half, or 50 per cent. of the gross capital value.

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[1] Under the Finance Act, 1909–10, this profit is to be made subject to an increment value duty of 20 per cent.

It will be observed that there is a somewhat considerable difference in the capital values shown in the two preceding examples, the first being intended to represent the *ordinary market value* as between a willing buyer and a willing seller ; while in the second case the speculative element has been appreciated, and the figures show the *prospective value* as a speculation.

As matters of detail, it may be pointed out that nothing has been allowed in respect of the returns that might be obtained through letting portions of the land for accommodation purposes, nor has the revenue been included that might be yielded by the sales or lettings of building sites during the course of development. The former could scarcely be appreciable, and might not be sufficient to cover the compensation payable to the outgoing tenant. In the case of the ground rental revenue, it may be assumed that if the development proceed uniformly, one-half of the area might be let during the first year, and the remainder during the second year, such lettings being subject to a pepper-corn rent for the first year, and one-half of the full ground rent for the second year, after which the full amount would become payable. The full ground rent for about one-half of the property would thus become payable in the third year, together with a proportion of the ground rents for the residue of the property, thus amounting to about £600 or £700.

On the other hand, the purchaser would be entitled to interest on the amount expended on roadmaking, which, if computed at 5 per cent. for two-and-a-half years, on an outlay of £5000, works out at the sum of £650. One item may therefore be regarded as being practically equivalent to the other. It is assumed that the ultimate making up of the roads will be carried out by the Local Authorities, and the cost borne by the several lessees or purchasers.

Other Special Values.—For the purposes of comparison, the property taken for the preceding examples may also be utilised for illustrating the other *special values* to which reference has been previously made.

Reserve Price Value.—Supposing, for instance, that the property were being offered for sale by auction, and a reserve price had to be fixed. This price, which would not be disclosed, is usually regarded as representing the lowest sum which it would be to the vendor's interest to accept rather than lose the chance of selling at the auction, or, as it is sometimes designated, 'the bedrock price.' Under reasonable competition the property would, of course, realise the ordinary market value before mentioned, which would be in excess of the bedrock reserve. For the purpose of arriving at this minimum value, a deduction of 10 per cent. might, perhaps, be made from the ordinary market value, which would leave a sum of £11,690 for the consideration of the parties interested.

Value for Purposes of Mortgage or 'Sacrificial Price.'—The ordinary market value, as previously determined, would form the basis for an advance in respect of mortgage. In the case of freehold residential and agricultural properties, with their social and sporting amenities, and where the capital value is based on actual rents that are properly secured, a margin of one-third of the ordinary market value is generally deemed sufficient ; but with building properties, where the capital value is based on estimated ground rents that are not actually secured, a margin of one-half is frequently allowed.

Taking the market value, therefore, at £12,988, a deduction of one-half leaves £6494 as *the advance value* of the property. In case of foreclosure this sum might, with certain arrears of interest added, represent the price for which the mortgagee might be willing to sell the property, and which might therefore be regarded as the 'sacrificial price.' Supposing, for the purpose of illustration, that a year's interest at 4 per cent. were in arrear, the price mentioned would work out at about £6,754.

Compulsory Sale Value.—In formulating a claim for compulsory sale an owner would be entitled to appreciate the speculative element of value. The second example given might, therefore, be adopted as the basis of the estimate, plus 10 per cent. for compulsory sale, unless the land should be required for town planning, or road improvements. The figures for the claim would thus work out at £14,731 + £1,473 = £16,204, or, in round figures (say) £16,250.

The several special values may be thus summarised in a gradually increasing ratio :—

	£
(1) The 'advance value' or 'sacrificial price'	6,754
(2) The 'reserve price' value for auction	11,690
(3) The ordinary 'market value'	12,988
(4) The 'speculative value'	14,731
(5) The 'compulsory sale claim-value'	16,250

If, for the purposes of the Finance Bill, 1909, the market value of £12,988 be taken as representing the 'original site value,' increment value duty of 20 per cent. would be payable on any sum obtained in excess of 10 per cent. of such market value.

Estate Duty Valuation.

Under the Finance Act, 1894, the principal value of any property is estimated to be the price which such property would fetch in the open market at the time of the death of the owner. In the case of purely agricultural properties, the value is not to exceed twenty-five times the annual value as assessed under Schedule A of the Income Tax Acts, after deducting outgoings, but where any part of the principal value is due to the expectation of an increased income in the future, as in the case of land possessing an appreciable element of building value, such limit does not apply.[1]

At first sight, therefore, the ordinary 'market value,' which we have previously described, seems to meet the requirements of the Act. It must not be forgotten, however, that in the case of estate duty estimates, no choice is given as to the time when the sale is to take place. In ordinary circumstances an owner endeavours to select a favourable time for placing his property on the market, and is thus often able to realise a higher price than would be obtainable if the property were offered at a less opportune season. This is more especially the case in the realisation of building properties. Having regard to this fact, there may well be some justification for making use of the 'reserve price' value for the assessment of death duties.

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[1] Under the Finance Act, 1909, provision is made to withdraw the 25 years' limit, and to assess agricultural land on the basis of its current value.

For the purpose of elucidating the matter we give hereunder a practical example of a report and valuation applicable to such a property as that indicated on the plan forming Fig. 2 :—

Rupert Street,
London, W.
.... 1909

To Messrs. ....

James Brown Esq., Deceased.

Dear Sirs,—

In accordance with your instructions we have made a careful inspection of the Holmewood Building Property for the purpose of advising you as to its value at the date of Mr. Brown's death, for the assessment of Estate Duty, and now beg to report to you as follows :—

Situation.—The property, which is understood to be of freehold tenure, is situated in the Parish of Holmdale, in the County of Middlesex, and is about five miles from the Marble Arch. It is within 1½ miles of three railway stations ; while electric trams are also easily accessible. The property is remarkably compact, and is bounded by roads on all sides, those on the south and west being of recent formation, while the roads adjoining the east and northern boundaries are old-established thoroughfares. With these facilities, and the natural attractions which the district offers, the whole property will in course of time become eligible for building development.

The frontages on the south and western sides of the property have already been partially covered with detached houses, possessing a rental value of £70 and upwards, and the adjacent frontage lands are at present undergoing development.

The timber trees standing on the estate are of an ornamental character, and as such are essential to its building qualifications.

Present Holdings.—For the purposes of this report the present holdings may be divided into the two following classes, viz. :—

1. The properties that are held under 99 years' leases, subject to the payment of ground rents ;
2. Those which are let subject to the payment of rack rents.

1. Ground Rental Properties.

These are all let under 99 years' leases of comparatively recent date, and the reversions, therefore, are of no appreciable value. The ground rents are fairly well secured, although in this respect there is, in some instances, a material difference in the proportion which the ground rents bear to the rack rental values. It will be observed, however, that the gross assessment value of the several properties is in no case less than five times the ground rent chargeable in respect of the same.

For the purpose of simplifying matters we have prepared a detailed schedule to accompany this report, in which are stated the amount of the ground rent, and of the gross assessment to property tax in each case :—

No.	Description.	Lessee.	99 Years' Lease from	Ground rent.	Gross assessment.
				£	£
1	Ville Road	Mr. J. Wilkes	Mar. 25, 1907	16	90
2	,, ,,	Do.	,, ,,	16	90
3	,, ,,	,, G. Brown	June 24, 1907	15	85
4	,, ,,	Do.	,, ,,	15	85
5	,, ,,	Do.	,, ,,	15	85
6	,, ,,	,, Jas. Snow	Sept. 29, 1907	15	85
7	,, ,,	Do.	,, ,,	15	85
8	,, ,,	Do.	,, ,,	14	85
9	,, ,,	Do.	,, ,,	12	85
12	,, ,,	Mr. H. Jones	Mar. 25, 1908	15	85
13	,, ,,	Do.	,, ,,	15	85
14	,, ,,	Do.	,, ,,	15	85
1	Rompton Rd	,, J. Richards	June 24, 1908	15	90
2	,, ,,	Do.	,, ,,	16	90
3	,, ,,	,, R. Smith	,, ,,	15	85
4	,, ,,	Do.	,, ,,	15	85
5	,, ,,	Do.	Sept. 29, 1908	15	100
6	,, ,,	,, H. Jarvis	,, ,,	17	120
				£271	

From the foregoing statement it will be seen that the ground rents amount to £271 per annum, and in arriving at their capital value we have, in the first place, made a deduction of £9 10*s*., being at the rate of about 3½ per cent., to cover the cost of collection and management, thus leaving a nett return of £261 10*s*. per annum. We have treated this last-mentioned sum as a perpetual payment, and which, taken on a 4 per cent. table, yields a total principal value of *Six thousand five hundred and thirty-seven pounds and ten shillings* (£6,537 10*s*.).

2. Rack Rental Properties.

The rack rental holdings together extend over an area of about 65 acres, as shown in the following schedule :—

Schedule of Rack Rental Properties

No.	Description.	Occupier.	Quantity.	Present Rental.	Gross Assessment.	Repairs & Insurance.	Tithe Rent Charge	Total Deductions.
			A. R. P.	£	£	£ s.	£ s.	£ s.
1	Accommodation land	Mr. J. Smith	56 0 0	200	212	12 0	22 0	12 0
2	Cricket field	Cricket Club	5 2 0	40	50	1 10	2 0	1 10
3	The Mount	Mr. J. Austin	3 2 0	170	180	30 0	1 10	31 10
			65 0 0	410	442	43 10	25 10	

Schedule (*continued*)

No.	Average net Annual Value during Development.[1]	Years' Purchase of Agricultural or Present Rental.	Capitalised Value of Agr. Rental.	Reversionary Building Value.	Total Capitalised Value.
	£		£	£ s.	£ s. d.
1	100 0	8·3	830	14,583 6	15,413 6 0
2	38 10	9·3	358	1,253 10	1,611 10 0
3	139 10	20·	—	——	2,790 0 0
Capitalised value of rack rental properties					£19,814 16 0

(1) From the foregoing schedule it will be seen that the major portion of the property is let to Mr. J. Smith, who holds under lease expiring at Ladyday, 1920, at a rental of £200 per annum, subject, nevertheless, to the lessor having the right to resume possession of any part of the holding required for building development upon giving twenty-eight days' notice, and allowing an abatement of rent at the rate of £5 per acre, per annum, for the land so taken, and paying for tenant-right.

For the purposes of our valuation we have divided the holding into eleven sections, and have estimated the prospective value of each block for building purposes. The gross value which we have placed on these different sections varies from £1100 to £1250, per acre, and the average periods required for development, from 6 to 18 years. To the present value of these prospective estimates, we have added the present capitalised value of the agricultural rental that the land might fairly be expected to yield during the course of development, and have then deducted from the aggregate sum an amount equal to twenty-five times the tithe rent-charge, to cover the cost of its redemption.

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[1] See p. 246, *post*.

(2) The cricket field is let under lease expiring at Michaelmas, 1922, at a rental of £40 per annum. In this case the lessor is liable for the whole of the road frontage charges, and a sum of £300 is now due in respect of Ville Road, which has just been completed by the Local Authorities. We have taken the present value of the rack rental, payable during the unexpired term of thirteen years, on the 5 per cent. table, and added thereto the present value of the reversionary building value, calculated at the rate of £1250 per acre, deferred for 18 years, on the 6 per cent. basis, but subject to development costs, and have then deducted the road frontage charges and the cost of redemption of the tithe rent-charge.

(3) The family residence known as ‘ The Mount ’ is let under yearly tenancy, together with the gardens and pleasure grounds. This is a very comfortable old-fashioned residence, yielding a sufficient rent to justify its remaining on the estate, and, appreciating the area of some 3½ acres, we have computed the value of the property on the 5 per cent. table, or twenty years' purchase.

GENERAL SUMMARY.

	£	s.	d.
Ground rental properties	6,537	10	0
Rack rental properties	19,814	16	0
Total principal value ..	£26,352	6	0

From the above summary it will be seen that the aggregate principal value of the two sections of the estate amounts to the sum of *Twenty-six thousand three hundred and fifty-two pounds, and six shillings,* (£26,352 6*s.*), and which sum represents, in our opinion, the fair value of the property for the assessment of death duties.

Yours faithfully,
A. —— & B. ——

In glancing at this form of report and valuation the young surveyor may not unreasonably think that more attention has been paid to the subject-matter than is generally deemed necessary for the purposes of probate, especially having regard to the comparatively low rate of remuneration allowed for such valuations. If he apply himself more closely to the figures he may also conclude that while the gross values mentioned appear to be very liberal, it is not quite clear how, by adopting such a basis as £1100 to £1250 per acre, the present average capitalised value of the fifty-six acres of undeveloped land, nevertheless, works out at not more than £275, per acre.

Such points are now seldom overlooked by the Somerset House Authorities, and it is well, therefore, for the valuer to be prepared to substantiate his own estimates and calculations.

Value per Acre.—In regard to the seemingly arbitrary estimate of £1250 per acre for blocks B, K, and L, it will be observed that portions of the land fronting Rompton and Ville Roads have been recently covered with houses. In the case of Rompton Road the plots have brought an aggregate ground rental of £93, and which, capitalised on a 5 per cent. basis as unsecured ground rents, yields a principal value of £1860. These sites, together with a proportion of the adjacent roads, extend over an area of about one-and-a-half acres, which, taken at £1250 per acre, works out at £1875, or within £15 of the estimated value of the adjoining land. Practically the same result will be found in the case of the Ville Road houses.

Development Period.—Turning now to the question of the average period of eighteen years allowed for the development of the fifty-six acres, it will be observed from the dates of the leases that during a period of about one-and-a-half years some eighteen houses have been erected. The sites of these houses embrace an area of about four-and-a-half acres, thus showing an average of about three acres per annum. This rate of development may appear to be a rather slow one, but regard must be had to the class of house that has been built. If, therefore, the remainder of the land is developed at the same rate, it will be covered in about eighteen-and-a-half years, or practically within the limit of the estimate.

The rates of deduction adopted (50 and 33⅓ per cent.) to cover the cost of development are fully discussed elsewhere (see pp. 233–235, *ante*).

The young valuer may, however, be called upon not only to explain the bases of his estimates, but to substantiate in detail the summarised figures of his valuation, and for this reason it may not be deemed out of place here to give in fuller detail the workings of our own valuation. Taking, therefore, the block of land let for accommodation purposes, the following supplementary statement will show the various calculations adopted in arriving at the aggregate capitalised value :—

Detailed Statement of Calculations.

Block.	Approximate quantity.	Gross prospective value, per acre	Nett prospective value, per acre.	Average number of years deferred.	Present percentage value at 6 per cent.	Present value, per acre.	Present capitalised value of reversion.
B	5¾	1,250	625	6	·70	437·5	2,515·7
C	5¾	1,150	575	12	·50	287·5	1,653·1
D	4½	1,150	575	12	·50	287·5	1,293·7
E	5¾	1,200	600	15	·41	246·	1,414·5
F	5¾	1,200	600	15	·41	246·	1,414·5
G	5	1,100	550	16	·39	213·5	1,067·5
H	5	1,150	575	16	·39	224·2	1,121·0
I	5	1,150	575	18	·35	201·2	1,006·0
J	4¼	1,100	550	18	·35	192·5	818·1
K	4	1,250	625	15	·41	256·2	1,024·8
L	5¼	1,250	625	10	·55	343·7	1,804·4
	A. 56						£15,133·3

Deduct, Tithe rent-charge £22 @ 25 years' purchase	550·
Reversionary building value	£14,583·3

During the development the land is estimated to yield an average rental of £110—£10 for repairs, &c. = £100, for a period of 12 years, thus representing a

present value of 8·3 years' purchase on 6 per cent. table	830·
Total capitalised value of agricultural section	£15,413·3

The details relating to the value of the cricket field are as follow :—

		£	s.	£	s.
Rack rental		40	0		
Less : Repairs, &c.		1	10		
Net rental value		£38	10		
Payable for 13 years, the present value of which on 6 per cent. table = 9·3 years' purchase ; £38 10*s*. × 9·3				358	0
Reversionary value.					
5½ acres at £1250, less cost of development at 33⅓ per cent., or £417 = £833 per acre = £4,581 10*s*.					
The present value of the reversion to £4581 10*s*., deferred for 18 years on 6 per cent. table ..		1603	10		
Deduct : Tithe rent-charge					
£2 at 25 years' purchase	£50				
Road frontage charges	£300				
		350	0		
				1253	10
Total capital value				£1611	10

It will be observed that these properties, having been let under lease prior to April 30, 1909, would not become liable to undeveloped land duty under the Finance Act, 1909.

Suitability of Scheme.—In the foregoing example it has been assumed that the method adopted is in every respect suitable for the development of the property, and that the necessary provision has been made to prevent its building potentialities being strangled in the future by restrictive covenants. Where, however, the development of an estate has been commenced under a scheme which, although suitable at the time, is subsequently rendered unsuitable on account of some important changes taking place in the locality, the undertaking may thus become a failure if the restrictive covenants will not permit of the method of development being adapted to meet the altered conditions. Such cases are to be found along the route of recently constructed tram lines, where, prior to the formation of the lines, estates were undergoing development for houses of a rental value of £80 and upwards, and the mutual covenants then adopted will not now permit houses of lesser value to be built. The owners are, therefore, placed on the horns of a dilemma, for whereas, on the one hand, the trams have effectually killed the demand for the larger residences, on the other, the restrictive covenants will not allow such smaller houses to be built as would let or sell readily.

Restrictions.—To avoid the possibility of such a deadlock, great care and foresight should be exercised in formulating the restrictions, in order to provide for possible contingencies. Indeed, as a safeguard it is often deemed advisable to reserve a right for the original owner to vary any of the restrictions, or the lines of proposed roads, so far as they may affect any portion of his property that has not been let or sold. While such a comprehensive reservation may effectually cover the owner's interests, it may also have a prejudicial effect on those of the purchasers or leaseholders, as it opens up the possibility that houses of an inferior class may be built on the adjoining land. In drafting the restrictions, therefore, the surveyor should aim at effectually protecting the owner's interests, while at the same time providing against the possibility of the purchaser's or leaseholder's interests being jeopardised by any alterations that may have to be made in the original scheme of development.

It is equally desirable that all unnecessary provisions which would tend to fetter the development should be rigidly excluded. The abortive efforts of the London County Council to effect a letting of their 'central island' Aldwych site afford ample evidence of the way in which development may be effectually stopped when overburdened by restrictions, even when the property is unquestionably ripe for building operations, as in the case of the well-known block referred to.

Land Value Duties and Parochial Rates Assessments.—While dealing with the question of outgoings chargeable on building properties, it became necessary, at the same time, to explain the principles underlying the bases of value adopted for the several assessments, and to avoid repetition, therefore, the reader may be referred to Chapter I. for full information regarding these valuations.

VALUATIONS FOR ADVANCES.

In the examples which have been given in this chapter the capital value of the land has formed the chief matter for consideration, but other valuations are often required in connection with building estates. Of these the more important are the valuations that have to be made from time to time of finished houses, or of those in course of erection, for advances to builders.

These advances are generally made by the landowner, although such loans are not infrequently made by building societies, as well as by speculators. The sum advanced may be equal to the prime cost value of the structure, where sufficient quantities of unused building materials are included in the security, or the loan may be limited to two-thirds of such value. The rate of interest usually charged is 5 per cent. per annum.

The methods adopted for arriving at the value of the structures vary according to circumstances, those more commonly in use being known as follows :—

I.—Proportional values.
II.—Price per foot cube.
III.—Price per square.
IV.—General quantities.
V.—Detailed quantities.

I.—*Proportional Values.*—Where the approximate cost of the house as finished is known, as is generally the case on building estates where a number of houses are virtually built according to the same plan, this method affords the most ready means of arriving at the prime cost value of the building, during its various stages of construction. The following percentages may be regarded as representing approximately the proportional values of ordinary suburban houses during construction :—

TABLE OF PROPORTIONAL COST OF HOUSES.

	Proportion of cost.
Drains laid, walls up roof-height ..	$\frac{1}{4}$
Brick and stone work finished, joists and roof timbers fixed	$\frac{1}{3}$
Roof finished and ceiling joists fixed ..	$\frac{1}{2}$
Partitions framed, sash frames fitted, floor boards laid, stairs fixed and walls and ceilings ready for plastering ..	$\frac{2}{3}$
Plastering finished, skirtings, casings architraves and mantel-pieces fixed..	$\frac{4}{5}$
Hanging doors, glazing, painting, paper-hanging, and other decorations and fitments completed	the whole

These percentages will, of course, require to be modified to meet the proportionate variations in artificers' work in houses of different class and finish. The average ratio of expenditure for the several trades is approximately indicated in the following table :—

PROPORTIONAL EXPENDITURE ON THE SEVERAL TRADES.

	Percentage of total cost.
Excavator, drain-layer and concretor ..	9·0
Bricklayer and mason	33·0
Slater or tiler	4·0
Carpenter and joiner	30·0
Founder, smith, and ironmonger ..	5·0
Plasterer	6·0
Plumber	7·0
Painter, glazier, and paperhanger ..	6·0
	100·0

II.—*Price per Foot Cube.*—This method is more generally applicable to finished buildings, or to those that are nearing completion. The length and breadth of the building are taken from out to out of the walls, and the height is measured from the bottom of the footings, or top of concrete, to half-way up the roof. Where rooms are constructed within the roof, the height should be taken at three-fourths, instead of one-half, of the roof.

To the number of cubic feet obtained from multiplying these three dimensions, the estimated average price, per foot, is applied.

In fixing the average price, per foot cube, regard must be had, to the size of the building, as small structures cost more in proportion than large ones ; to the percentage of voids and solids, including the number of internal divisions ; to the description and quality of the materials and workmanship ; and to the general conditions of the contract. In the hands of an experienced surveyor, and with the exercise of due care, fairly accurate results may be obtained by this method.

The average cost, per foot cube, may be approximately stated as follows :—

	Per foot cube.
Family mansions (main building) ..	10*d*. to 1*s*. 3*d*.
,, (servants' offices) ..	6*d*. to 9*d*.
Detached villas	8*d*. to 10*d*.
Semi-detached villas (1st quality) ..	6*d*. to 8*d*.
Second class villas	4*d*. to 6*d*.
Artisans' block dwellings	7*d*. to 8*d*.
,, model cottages	4*d*. to 6*d*.
Labourers' cottages	4*d*. to 5*d*.
Stables, first class	8*d*. to 10*d*.
,, second class	7*d*. to 8*d*.

The height of the building will of course influence the price, per foot cube; a house of two or more storeys is comparatively less costly than a building of one storey only, as the expenditure on excavation, roofing, &c., is proportionately lower.

III.—*Price per Square.*—This method of estimating values is more suitable for one-storey buildings, such as bungalows, although it is occasionally used for buildings of two or more storeys in height. The dimensions of the site actually occupied by the building only are taken into account, such superficial or ‘ plinth ’ area being obtained by taking the dimensions of the walls from out to out at ground level, so as to include any projections at the base of the building, such as plinths, &c.

In pricing, regard will be had, in the first place, to the area of the site occupied, as the smaller the space enclosed the greater will be the cost of the brickwork, &c., in comparison with the superficial contents; and subsequently to the thickness of the walls and manner of finishing, including foundations, plaster, paper, and other decorations; to the floors, with the flooring joists, strutting, and ceilings; to the roofing, with the slating or tiling leadwork, roof timbers, boarding, &c. For buildings of more than one storey in height, the floors are sometimes dealt with separately, in which case the ground floor is taken to include the foundations, floor, &c., and the upper storey, the floor joists, flooring, finishings, as well as the roof covering. There is seldom much difference in the average cost of the floors of a two-storey building, that of the ground floor, including the foundations, being about the same as the upper storey, which includes the roof covering. To obtain an accurate result, by this method of estimating, calls for the exercise of close discriminating judgment and much care.

The average price, per square, applicable to different classes of houses, may be approximately stated as follows :—

	Per square.
First class family mansions with principal rooms 15–16 ft. high	£70 to £100
Second do., do., 12–14 ft. high	£50 to £70
First class detached villas, do., 10–12 ft. high	£50 to £55
Second do., 9½–10½ ft. high	£40 to £50
Third do., semi-detached, 9–10 ft. high .	£42 to £47
Fourth do., do., or in terraces with frontage not exceeding 20 ft., 9–9½ ft. high	£40 to £45
Cottages, two-storey (co-partnership tenants)	£25 to £30
Bungalows (brick)	£50 to £60
Do. (corrugated iron)	£20 to £30
	Per room.
Artisans' dwellings (arranged in blocks), brick	£70 to £90
Model cottages (municipal)	£42 to £55

The foregoing estimates do not include the cost of building boundary walls, or the formation of paths, grounds, &c.

IV.—*General Quantities.*—This method is adopted where a closer and more reliable estimate is needed than can be obtained by either of the methods that have been previously described. The quantities, which are classified under as few general headings as possible, are usually taken in a comprehensive manner from the plans. The external walls are measured from the bottom of the footings to the eaves, and extreme length, and are priced to include footings, doors, and windows, together with the plastering and other decorative work connected therewith. Internal walls are measured and priced in a similar manner. The several floors are measured and priced separately, the item including joists, boarding, hearths, ceilings, and decorations.

The roofs are generally measured on the slope, and are priced to include the roof covering and timbers, rafters, boarding, eaves gutters and down pipes. Other items priced separately include staircases, fitments, such as water-closets, baths, mantelpieces, grates, kitcheners, gas and water fittings, drains, manholes, and an all-round ten to fifteen percentage for contingencies.

It is perhaps unnecessary to point out that this method affords ample scope for the exercise of judgment in grouping the various items, as well as in estimating the values. In the subjoined statement are given some suggestive prices for the more important items, and which are applicable to good class residences :—

	Per cubic yard.
Excavations and concrete foundation	15*s*. to 20*s*.

	Per square.				
	£	*s*.		£	*s*.
Brick walls (without allowance for doors and windows), 14 in.	10	0	to	£11	0
Do., 9 in.	8	10	to	9	10
Add for each bay window complete	13	0	to	16	0
Stone walls	12	0	to	14	0
Internal walls, 9 in.	8	0	to	9	0
Do., 4½ in.	7	0	to	7	10
Roofs, complete, slated	5	10	to	7	0
Do., tiled	6	0	to	7	10
Floors, including ceilings	7	0	to	8	10
	Per ft. in height.				
Staircases, 3 ft. wide	1	10	to	2	10
Do. 4 ft. 6 in. wide	2	10	to	3	15

	Each.				
	£	s.		£	s.
Water closets, complete, but exclusive of soil and ventilating pipes and water supply, cottage	3	0	to	4	0
Pedestal do., with mahogany seat ..	5	10	to	6	10
Best quality valve closet	10	0	to	12	0

V.—*Detailed Quantities.*—This method is only adopted when it is necessary to determine, as precisely as possible, the 'prime cost' value of the work that has been executed. In cases where houses have been completed by contract under priced bills of quantities, it will be sufficient for the surveyor to ascertain the value of the omissions and extras, and adjust the aggregate sum accordingly.

Where an advance, closely approximating in amount to the value of the completed work, is required in respect of a house that is in course of erection, it will be necessary for the surveyor to note such items as have been properly finished, and to measure up such other work as may have been partially executed, pricing both in accordance with the bill of quantities.

Houses are sometimes erected on the basis of a 'schedule of prices,' which consists of a tabulated list or schedule of the various materials and workmanship that will probably be required, the prices of which are filled in by the builder. This method necessitates the whole of the work being carefully measured up when completed, and the value computed on the basis of the prices appearing in the schedule.

In this connection it may be noted that the term 'prime cost' (P.C.) is understood to mean the sum paid to the merchant for goods, after deducting all trade discount for such goods in the ordinary course of delivery, but not deducting discount for cash, and such sum is to be exclusive of special carriage, the cost of fixing, and contractor's profit. The term 'list price' (L.P.) refers to the published price given in the merchant's catalogue or price list, and, as a rule, includes trade discount.

For fuller information regarding the valuation of buildings by detailed quantities, the reader is referred to such works as Leaning's 'Quantity Surveying'; while for the more general methods of assessing values, the data given in Coleman's 'Approximate Estimates' will probably be found of service.

STATEMENT OF AVERAGE MARKET VALUE OF PROPERTIES BASED ON NETT ANNUAL RETURNS:—

	Rate of return yielded. Per cent.	Years' Purchase.
Freehold building land (on estimated ground rental value) ..	5 –7	20 –14·3
Ground rents, well secured (freehold)	3½–4	28·5–25
Do. (long leasehold)	5 –6	20 –16·6
Freehold houses: mansions or first class villas	4 –5	25 –20
Do. detached or semi-detached villas	5 –6	20 –16·6
Do. terraced houses, cottages, &c.	6 –8	16·6–12·5
Leasehold houses, substantial ..	5 –6	20 –16·6
Do., ordinary	6 –8	16·6–12·5
Do., inferior	8–10	12·5–10
Freehold business premises, first class	4½–5	22·2–20
Do., second class	5 –6	20 –16·6
Leasehold do., first class ..	5 –6	20 –16·6
Do., do., second class	6 –7	16·6–14·3

STATEMENT OF THE RATE OF INTEREST, OR RETURN EQUIVALENT TO DIFFERENT NUMBERS OF YEARS' PURCHASE :—

Per cent. interest.	Years' purchase.
1	100
1½	75
2	50
2½	40
2¾	36·36
3	33·33
3¼	30·77
3½	28·57
3¾	26·66
4	25
4¼	23·53
4½	22·22
4¾	21·05
5	20
5½	18·18
6	16·66
7	14·28
8	12· 5
9	11·11
10	10

APPENDIX A

Form of Specification with General Conditions, Bill of Quantities, and form of Tender for Works comprised in the formation of Park Road, as shown on Plan, Sections, and Detail Drawings forming Figs. 5, and 19 to 23, inclusive.

The General Conditions should provide, amongst other matters, for discrepancies between plans and sections, detailed drawings and specification; for variations and extras; valuation of such alterations; compliance with local bye-laws and regulations; supervision by Surveyor or Clerk of Works with power to reject bad workmanship or material; responsibility for damage to life and property; limit of time for completion, and its extension if necessary; possible delay; possible bankruptcy of contractor; payment; and settlement of disputes by arbitration.

Specification of Work required to be done in the formation of a proposed new road on the Estate to be named Park Road, and in the construction of a system of Sewers and Surface Water Drains together with all contingent manholes, ventilators, inspection chambers, gulleys and other works more particularly described herein, and delineated upon the plans and sections and detail drawings prepared by

A——— B———,
Surveyor,
10 C——— Street,
London.

May 19——

GENERAL CONDITIONS

Definition of Terms.

1. In these Conditions and Specification attached thereto, the following terms shall have the meanings herein assigned to them :—

The term 'Employer' shall mean E——— F———, Esquire, of ———— in the County of ————.

The term 'Contractor' shall mean and include the person or persons, firm or company, contracting for the works herein specified, and shall include his or their heirs executors administrators and assigns.

The term 'Surveyor' shall mean and include Mr. A——— B———, of 10 C——— Street, London, or his properly accredited representative.

The term 'Borough Surveyor' shall mean the Borough Surveyor for the time being to the Corporation of .

Nature of contract.

2. The Contract is for the laying of the materials and the construction of the works specified hereafter and the maintenance of same for a period of six months from the date of completion.

Omissions.

3. The following Specification shall be considered the basis upon which the Contract entered into by the Employer shall be founded. Should anything have been omitted therefrom which is necessary for the proper completion of any part of the work or works, the Contractor shall, at his own expense, execute the same as if it had been more particularly described, and supply, deliver, erect and maintain whatever may be wanting to complete the whole in a workmanlike manner, according to the true intent and meaning of the Specification.

Contractor to visit site.

4. All parties tendering shall be deemed to have carefully examined the Drawings in addition to the Specification and also to have visited the site and ascertained for themselves the peculiar nature and value of the different works, and the character of the surface soil and subsoil, and to have included for the same in their Tender, as no allowance whatever will be made for any alleged deficiency of description.

Contractor to provide all materials, labour &c.

5. The Contractor shall at his own cost provide all materials, labour, workmanship, plant, tackle, &c., and

everything necessary and requisite for the proper, safe, expeditious, and entire execution and completion and subsequent maintenance for six months of the works hereinafter specified.

Quality of materials and workmanship.

6. The whole of the materials used throughout the Works shall be of the best and most approved qualities of their several kinds and they shall be applied in a substantial and workmanlike manner in accordance with this Specification and the Plans, Sections and Detail Drawings named therein, or to such additional particulars explanations or drawings as may be found requisite to be given during the execution of the Works, and to the full and entire satisfaction of the Surveyor and also to that of the Borough Surveyor to the Corporation.

Contractor to remove inferior materials.

7. Should any materials be brought upon the ground which, in the judgment of the Surveyor, shall be of bad or inferior quality, such materials shall not be used upon the works, but shall be forthwith conveyed away at the cost of the Contractor, as the Surveyor shall in each case determine and direct.

Defective work or materials.

8. The Surveyor shall at all times have full power to inspect the works or any part thereof or materials used and if at any time any work shall in the judgment of the Surveyor be executed with unsound materials or in an imperfect or unskilful manner, or not in accordance with the Specification, the Contractor shall at his own expense rectify, reconstruct or restore such work in such a manner as the Surveyor shall direct, and in case the Contractor or any of his foremen or workmen shall refuse or neglect to carry out such rectification, reconstruction or restoration within forty-eight hours of receiving orders to do so by the Surveyor, then the Surveyor shall be at liberty, and he is hereby empowered, to employ other workmen, to use other materials and appliances in lieu of same, and to rectify, reconstruct or restore any such unsound, unskilful or imperfect work, and the additional costs and charges incurred thereby shall be paid on demand to the Employer by the Contractor, or may be deducted from any moneys due or to become due to the Contractor under this Contract.

Disputes.

9. The directions of the Surveyor as to the manner of executing the various works are at all times to be strictly

attended to whether given personally or by his representative. And in the event of any dispute arising as to the true intent and meaning of the Specification, Schedule of Quantities, Prices, or Drawings as to the extent of the Works to be performed thereunder, as to the Works having been duly and properly completed, or as to any other matter, claim, demand, or obligation whatever arising out of or in connection with the Contract whether during the execution of the works or after the execution thereof such dispute shall be referred to the Surveyor whose decision shall be final and binding upon all parties.

Accidents and claims.

10. The Contractor shall take the whole risk and liability of executing the work according to the provisions of this Specification and shall take all liability for any damage to persons or property, and more particularly the crops on the adjoining land caused by the execution of the works whether from negligence of the Contractor or his servants, or by accident, lack of skill, or otherwise and shall indemnify the Employer or any of his Agents or Servants from all actions, claims, costs and charges in respect thereof, and all claims under the Employer's Liability and Workmen's Compensation Acts, and against all legal proceedings brought in respect of the execution of the said works; and in case the work shall be delayed or stopped by reason of any legal proceedings, the Employer shall not be liable to make good any loss or damage sustained by the Contractor by reason thereof, and the Contractor shall take all liability thereunder, but the Surveyor shall in such case extend the time for the completion of the Contract to such extent as he shall deem equitable.

In the event of the Contractor failing to pay any claims, costs and charges incurred on account of any such damages or accidents, the Employer shall have the power to pay such claims, costs and charges and to deduct the amount thus disbursed from any money or moneys due or to become due to the Contractor, or to otherwise recover the amount from the Contractor.

Sub-letting.

11. The Contractor shall not assign the Contract or any part thereof to any other person, nor shall he underlet to or make a sub-contract with any other person or persons

for the execution of any part of the work appertaining to the Contract without the consent in writing of the Surveyor.

Notices and fees.

12. The Contractor shall give due and sufficient notices and pay all such fees as are required by law to be given to any person or persons or companies entitled to notice in respect of any operations to be performed under the Contract, and shall do no unlawful act, or omit to do anything required by law, in or about or incidental to the execution of the Contract, and all such work performed by the Contractor and the Contractor's servants shall be done without negligence and with all due care, skill and ability so as not to occasion any avoidable or unlawful interference, injury or prejudice (whether immediate or consequential) with or to the rights, interests or property of any persons or companies.

Borough Surveyor.

13. The works throughout are to be executed in all respects to the satisfaction of the Borough Surveyor, and the Contractor shall conform in all respects to the provisions and regulations of any general or local Act of Parliament, or of any Bye-laws which may be applicable to the execution of the work comprised in the Contract, and the full nature of which the Contractor shall be deemed to be cognisant of at the time of signing the Contract and he shall indemnify the Employer against all penalties, costs, claims, damages and expenses incurred by them by reason of the non-observance of any such provisions or regulations.

Damage to roads, footways, &c.

14. The Contractor shall reinstate, relay and make good, to the satisfaction of the Borough Surveyor or pay to the Corporation of   for reinstating, relaying and making good the portions of any existing footways, carriage-ways, roads, or sewers and works appurtenant thereto that may be interfered with or damaged by the execution of the Works, or by the cartage of materials or plant to and from the Works.

Interference with gas or water pipes, sewers, &c.

15. The Contractor shall exercise due care in carrying out the Works so as not to injure or interfere with any gas, water, electric light, or other mains, field drains, sewers, manholes, underground telegraphs, or appliances connected therewith, which may be met with on the line of the works

and he shall be responsible for and make good at his own cost all damage of whatsoever kind caused to any of these works by his operations or the operations of his workmen.

Care of works.

16. The Contractor shall take all proper care of the whole of the works included in this Contract, together with any additional works which may be directed by the Surveyor to be carried out during the progress of the Works, from the time of their commencement until such time as they are completed and handed over and shall upon all needful occasions properly protect and preserve in such manner as he may think fit, and in case any damage or injury shall happen to the works, or any part or parts thereof, whether occasioned by rains, streams, frost or any other natural or artificial cause, the Contractor must repair and make good the same at his own cost and charge to the satisfaction of the Surveyer so that at the completion of the work, or any part thereof, the same shall be properly and completely finished and perfect in all its parts and in conformity in every respect with the Contract.

Sign contract drawings and specification.

17. The Contractor will be required at the time of signing the Contract, to sign the Contract Drawings and a copy of this Specification, which shall be countersigned by the Surveyor and remain in his possession.

A copy of the Contract Drawings and Specification will be supplied to the Contractor for his use, which together with any other drawings or particulars which may be supplied to him shall be kept in an office upon the Works, and shall be open during all working hours to the inspection of the Surveyor, his representative, or the Clerk of Works, and shall at the completion of the works be returned to the Surveyor.

Foreman.

18. The Contractor shall keep continually upon the Works, during all working hours, a competent Foreman in charge who shall be considered the representative of the Contractor and to whom the instructions of the Surveyor may be given.

If, in the opinion of the Surveyor the Foreman or any one or more of the workmen employed by the Contractor upon the Works be found incompetent or act in an improper manner, the Surveyor shall be at full liberty to discharge or order him or them to be discharged forthwith, and the Contractor shall not further employ him or them on the Works again without the permission of the Surveyor.

Clerk of works.

19. The Clerk of Works shall be considered to act solely as Inspector, and under the Surveyor, and the Contractor shall afford him every facility for examining the works and materials.

Setting out works.

20. The Surveyor will prior to the commencement of the work set out the lines of the proposed roads. In every other respect the Contractor shall be held responsible for the proper setting out of the works and for the accuracy of the levels and he shall keep them correct in every particular according to the drawings and specification, or such direction as he may receive from time to time, and he shall be held responsible for the correctness of the same throughout the whole term of the Contract.

The Contractor must provide all labour required for checking such setting out and also all stakes rods, &c. requisite; and shall at his own cost rectify any errors or imperfections arising from incorrect setting out that may be discovered either during or after the completion of the works for the full term of his maintenance.

Specification and drawings.

21. The various works are to be constructed in all respects as set forth in the Specification, and by the Plans, Sections and Detail Drawings now furnished, and in accordance with such additional drawings and particulars as may hereafter be given by the Surveyor in explanation thereof, or to indicate any deviation which may be ordered under the conditions of the Contract.

Quantities.

22. The quantities given in the Bill annexed to this Specification are taken out, and are provided for the convenience of the Contractor in arriving at the amount of his Tender, and must not be taken as comprehensive or inclusive of the whole of the works covered with this Specification.

They have been taken out with all due care but their accuracy and sufficiency is in no way guaranteed and the Contractor must satisfy himself as to their accuracy and sufficiency before sending in his Tender, as no alteration or addition to these will be permitted after the acceptance of his Tender, and no extra work whatever will be recognised except as ordered in writing by the Surveyor as 'Extra Works.'

Discrepancies (if any).

23. The Drawings and Specification together with the Conditions, Bill of Quantities and Contract are to be considered as explanatory of each other and should anything appear in any or either of them which is not shown or described in the other or others, no advantage shall be taken of such omission, and the Contractor must fully consider this in forming his estimate. Should any discrepancies however be found, or should any misunderstanding arise as to the meaning and import of the Specification or Drawings, or any of them, or any part thereof, or as to the quality, quantity, or dimensions of the materials used, or intended or directed to be used in the execution of the works, or as to the measurement or quantity or value of the works executed under the Contract, or any part thereof, or as to any extra thereupon, or deductions therefrom, the same shall be explained or decided by the Surveyor, whose explanation or decision shall be final and binding upon the Contractor, who shall execute the work according to such explanation or decision, and (subject as hereinafter appears in the case of extras and deductions) the same shall to all intents and purposes be deemed to have been taken into account by the Contractor, in his estimate, as if the same had been shown and set forth in the Drawings and Specification, and the value of the work shall be considered as included in the amount of the Contract.

Wherever dimensions are marked on the plans or sections, or described in the Specification, such dimensions are to be worked to in preference to scaled dimensions. The Contractor must without any extra charge, execute the several parts of the works in strict compliance with the detailed drawings that may from time to time be furnished by the Surveyor, provided they be such as not to vary from the true intent and meaning of the Contract.

Power to vary works.

24. The Surveyor shall have full power and authority from time to time and at all times to make and issue such further drawings and to give such further instructions and directions as may appear to him necessary or proper for the

guidance of the Contractor, and for the good and sufficient execution of the works according to the terms of this Specification.

The Surveyor may also without in any way vitiating the Contract, alter or vary the levels, line or position of any of the works or may order any of the works to be omitted, with or without the substitution of any other work in lieu thereof, or may order additional works to be executed, and the Contractor shall in pursuance of such orders and directions, execute the works in conformity therewith, but shall not otherwise make any alterations, variations, omissions, substitutions, or additions in, from, or to the works.

The right of the Surveyor as set forth in the last preceding paragraph to order any of the works to be omitted shall be deemed to include the right to withdraw from the Contractor the execution of any section or class of work which, in the opinion of the Surveyor, is not being executed satisfactorily, or with due and proper expedition, and in such event the Employer shall be entitled to execute such work himself or to employ other contractors or workmen and to provide the necessary material, and to charge the extra expenses incurred thereby to the account of the Contractor, and to deduct the same from any sum or sums due or to become due to the Contractor under the Contract.

Value of alterations and deductions.

25. The value of such increases and diminutions or alterations shall be ascertained and valued by the Surveyor solely and added to or deducted from the amount of the Contract as the case may be, and in order that he may be enabled to make a fair and equitable valuation of such variations aforesaid the Contractor shall fully price out the Schedule of Quantities attached to this Specification, in which the total shall agree with the amount of his tender and the rates shall be for the full completion of the several portions of the work, and shall cover and include all contingencies and obligations put upon the Contractor.

He shall also fill in the accompanying Schedule of Prices which shall be similar to those upon which his tender is based and for which he will undertake to execute any extra work which he may be required to do, in strict accordance with the Specification, details and written instructions which he may receive for such work.

In ascertaining and valuing the said increases, diminutions or alterations the Surveyor shall have regard to the said Priced Schedules, and in the event of their being in any way imperfect or incorrect, or should the same not contain the prices for any work or materials the subject matter of any increase, diminution or alteration, the value thereof shall and may be fixed by the Surveyor in his absolute discretion.

Extra Vouchers.

26. No charges will be allowed for extra work except the same be done under an order in writing from the Surveyor.

Weekly returns of such extra works, containing a true statement of the labour expended and the prime cost of materials used, must be delivered at the Surveyor's Office, 10 C——— Street, London, W., not later than 10 o'clock on Saturday morning in each week, and before the works are placed out of view or beyond check or measurement.

The non-delivery of any such statement at the proper time shall be considered as an abandonment on the part of the Contractor of any claim for the amount or value of such extra works and as exonerating the Employer from all liability thereto.

Commencement of works.

27. The work shall be put in hand immediately the order to proceed has been given to the Contractor in writing by the Surveyor.

Suspension of works.

28. The Surveyor or his representative shall have full power to delay or suspend the progress of the Works, or any portion thereof without vitiating the Contract should it be deemed necessary to do so on account of the inclemency of the weather, defective material being used, alterations to gas, water or other mains, or from any other cause, and that without any charge being made by the Contractor, but he shall be allowed such extra time beyond that stipulated for the completion of the works as the Surveyor may consider reasonable.

Negligence, bankruptcy, &c.

29. If the Contractor shall from any cause (other than some cause arising from the acts of the Employer or his authorised Agents) be prevented from or delayed in entering upon or proceeding with the execution of the works or the

providing of the materials with proper despatch, or keeping the same in repair in accordance with the present Contract, or shall not proceed with the execution and providing of the said works and materials according to the terms and conditions of the Contract, it shall be lawful for the Employer (if he should think fit) by notice in writing under the hand of the Surveyor to the Contractor, to require the Contractor to enter upon or commence or regularly and effectually to proceed with and execute the works and provide the materials; and in case the Contractor shall for seven clear days after the delivery of such notice neglect to effectually enter upon or proceed with the execution of the said Works and the providing of the materials, or in case there shall be commenced under the Companies Acts a winding-up in respect of the Contractor (being a Company), or in case a Receiving Order shall be made for the protection of the estate of the Contractor (being an individual), or in case the Contractor shall make any arrangements or composition with his Creditors, or shall do any act or take any proceedings having under any Act, for the time being in force, effects or results similar to those of bankruptcy, or in case the Contractor shall assign or sublet this Contract or any part thereof or the benefits or burdens thereof without the consent in writing of the Surveyor, or in case the interest of the Contractor in this Contract shall be taken in execution, then and in any such case it shall be lawful for the Employer, without avoiding this Contract, to take the work wholly or partially out of the hands of the Contractor and to revoke the Contractor's licence to use and to take possession of the works and all or any materials, plant, tools, machinery, matters, and other things used in or about the same, and to employ another Contractor or other Contractors, or to purchase materials and appliances, and to employ other workmen, and (without prejudice to any other remedy) to take such steps as he may consider necessary to carry out and complete the liabilities of the Contractor under this Contract, and whatever expenses the Employer is put to thereby, or in consequence thereof, shall be paid to the Employer by the Contractor and may be deducted from any moneys which the Surveyor may certify to be due to the Contractor from the Employer after completion of the work, and if the cost of completing the works should exceed the balance due to the Contractor, the aforementioned plant, tools, machinery and other things may be sold by the Employer and the proceeds applied towards the payment of such difference, and any outstanding balance existing above the proceeds of such sale shall rank as an ordinary debt against the Contractor's estate.

Fence, watch and light.

30. The Contractor shall properly and efficiently fence, watch and light, or otherwise protect, by night and day any open cutting, dangerous place, or deposit of earth, plant or materials, or any work that may interfere with the safety and convenience of the Public.

Materials brought on site.

31. All plant and materials as and when delivered upon the site or intended site of the works, or upon any land occupied or used by the Contractor, in connection with or for the purpose of executing the said works, shall become the absolute property of the Employer, but the Employer will permit the Contractor as and from such delivery to use the plant and materials in and for the completion of the works until his bankruptcy, or in case the Contractor is a Company, until a winding-up shall be commenced in respect of the Contractor, or until the abandonment of the Contract, or until the forfeiture of the Contract, or until the use of the plant and materials by the Employer under the powers hereinbefore contained; but the conditions shall not prevent the rejection of materials not approved at any time by the Surveyor, and the Employer shall not be in any wise answerable or liable for any loss or damage which may happen to or in respect of the said plant or materials being lost, stolen or injured.

The Surveyor may, upon completion by the Contractor, or at any stage in the progress of the work, certify that materials and plant not required for the purposes of the works may be removed by the Contractor, whereupon the property in such materials and plant shall revert to the Contractor, and the same shall thereupon be removed by him, but it is expressly agreed that this option of the Surveyor, unless exercised, shall not confer upon the Contractor any right in law or in equity to the said materials or plant.

Storage of materials.

32. The Contractor shall at his own expense provide all land or ground that may be required for the temporary storage of materials, tackle or plant.

Notice to contractor.

33. The Contractor shall have an office upon or near the works to be open at all reasonable hours. All notices under this Contract may be given to or served upon the Contractor or his foreman personally, or they shall be deemed and taken to be effectually given or served by the delivery thereof at the above-mentioned office, or at the usual or last known place of business or residence of the Contractor, or such notices may be served by sending the same to such office or to the usual or last known place of business or residence of the Contractor, by post.

Office for Surveyor.

34. The Contractor shall also provide from the commencement to the completion of the works, and in close proximity to same, a suitable portable office for the Surveyor or his representative, properly fitted with drawing desk, lock-up drawers, stove, &c., and the Contractor shall supply fuel and lights when required. At the completion of the works the office shall be the property of and shall be removed by the Contractor.

Trial holes.

35. The Contractor shall sink any such trial holes, or excavate any such trenches as the Surveyor may deem necessary for ascertaining the exact position or level of any sewer or storm water drain.

Contingent works.

36. The Contractor shall from time to time and at any time or times as the Surveyor may think fit afford all necessary facilities for other Contractors or workmen to execute contingent works, and for the connection of such works to the works included in this Contract, and in case of difficulty or dispute as to any necessary or proper arrangements for mutual convenience, the Contractor shall be bound by the orders and determination of the Surveyor.

Completion of works.

37. The whole of the works included in this Contract are to be completed in every respect and cleared of all tackle, implements and rubbish within three months from the date of order to proceed given by the Surveyor, unless he shall in his discretion extend the time for completion.

Penalty.

38. Should the Contractor fail to complete the works within the time specified he shall forfeit and pay to the Employer as liquidated damages the sum of twenty pounds

per week, and every week or part thereof during which such completion shall be delayed, and the Employer may deduct the amount or sum so forfeited from any moneys in his hands due or to become due to the Contractor.

Unavoidable delay in finishing.

39. But if in the opinion of the Surveyor the work shall have been delayed by inclemency of the weather, or by a general strike of the workmen employed, or by the execution of extra works, or from any cause over which the Contractor has no control, then such further time shall be allowed for completion as the Surveyor shall deem right and equitable.

Surveyor to certify completion.

40. The works shall not be deemed finished or complete until they shall have been certified to be so in writing by the Surveyor, but the Surveyor's certificate shall in no way release the Contractor from liability for any injury sustained by reason of any latent defect arising either from the use of improper materials and workmanship, or from incompleteness in any part of the work, or otherwise.

Certificate of Surveyor.

41. No sum or sums of money shall be payable to the Contractor, nor shall he make any claims or demands against the Employer for or in respect of any work executed by him, unless the Surveyor shall first have certified the amount thereof, and that the Contractor is entitled to payment of such amount.

The Surveyor may by any certificate make any correction or modification in any previous certificate.

Payment.

42. Payments will be made during the progress of the work, not oftener than once in every month, at the rate of 80 per cent. upon the value of the work executed as certified by the Surveyor.

The 20 per cent. retention money will be paid by the Employer in two equal instalments, the first instalment being due and payable when the works are certified as complete by the Surveyor, and the second instalment on the certificate of the Surveyor that the works have been maintained in proper order and repair for a period of six months from the completion of the Contract as hereinbefore specified. Provided always that the Employer shall have the right to deduct therefrom any sum or sums which may become due and payable to him by the Contractor under the provisions of these Conditions and

Specification, as certified by the Surveyor. No certificate for payment on account shall be taken as evidence that the Contractor has duly executed such work or any portion thereof in accordance with the Specification, or as relieving the Contractor from any responsibility under the Contract.

Period of maintenance.

43. The Contractor shall maintain the whole and every part of the works comprised in this Contract, together with such further works as may be ordered by the Surveyor as aforesaid (if any), in thoroughly good, substantial, sound, perfect and watertight condition, and in complete repair, filling in all settlements and finding all materials required for the proper maintenance of the works, for a period of six months from and after the date of completion thereof, as certified in writing by the Surveyor.

The Employer reserves the right to use any portion of the works before the final completion of the whole of the works under this Contract, but such use shall not invalidate the Contract, nor constitute an acceptance of the works.

Tenders.

44. The Contractor shall make out his Tender on the form supplied by the Surveyor. The Employer does not bind himself to accept the lowest or any tender, nor will he be responsible for or pay for any expenses or losses which may be incurred by tenderers in the preparation of the Tenders or Contracts.

Date of receipt of tenders.

45. Sealed Tenders (being the General Conditions, Specification, Quantities, and Tender Form complete) addressed to 'Mr. A——— B———, Surveyor, 10 C——— Street, London,' and endorsed 'Tender for Road Works' are to be delivered not later than noon on the 8th day of June, 19—.

Sureties.

46. The Contractor shall find two responsible sureties, to be approved by the Employer, who shall be bound with him jointly and severally in a sum equivalent to ten per cent. of the gross amount of the Contract, for the due and satisfactory performance of the whole of the works comprised in this Contract, and for the maintenance of such works for a period of six months from the date of completion, as certified by the Surveyor.

Deed of contract.

47. The Contractor will, upon the acceptance of his

Tender, enter into and execute a Deed of Contract in a form to be prepared by the Employer's Solicitors.

Coins, &c., to be given up.

48. All fossils, coins or other articles of antiquity or value which may be discovered in the course of the works are to be preserved and delivered into the custody of the Surveyor.

Surveyor's Fees.

49. The Contractor shall pay out of the first amount certified as due to him the Surveyor's fees for Bill of Quantities, &c., and also the provisional amount stated therein for lithographing plans and specification.

Patent Rights.

50. The Contractor shall indemnify and hold the Employer harmless in the event of any action arising in respect to patent rights relating to any of the plant or materials used or supplied under this Contract, and any fees or royalties properly chargeable in respect to such plant or materials shall be paid by the Contractor, and shall be deemed to be included in the Contract Price.

SPECIFICATION.

MATERIALS.

Bricks.

51. To be best hard Stocks, sound in every respect, square, well-burnt, and even in size, those used for the vaults and arches to Manholes to be radiated. No brick must absorb more than one-sixth of its dry weight in water during one day's immersion.

Sand.

52. To be clean, sharp, pit or fresh water sand, coarse grained, and of approved quality. To be entirely free from loam, clay, dust or organic matter, and if directed it must be washed, when used with cement.

Portland cement.

53. The Portland cement shall be obtained from an approved maker, and shall be of the best quality, composed entirely of thoroughly well burnt clinker, ground fine enough to pass a sieve of 2500 meshes to the square inch without leaving more than 10 per cent. by weight behind, after being sifted five minutes. It shall not weigh less than 112 lbs. per striked imperial bushel when lightly filled into a measure from an inclined trough placed 12 inches above the measure.

Test briquettes made of the cement mixed with 20 per cent. by weight of water shall be capable of maintaining—after seven days' immersion in water—a tensile strain of 400 lbs. to the square inch. The immersion to commence within 24 hours of the briquettes being made, and the temperature of the atmosphere and water in which the test briquettes are made and immersed shall not be less than 40° Fahr.

The cement shall be delivered upon the works in such quantities as to allow of it being emptied and spread upon the dry wooden floor of a covered shed, to a depth not exceeding 18 inches, and so exposed to the air for a period of not less than 14 days, or such other period as may be approved by the Surveyor.

Cement Mortar.

54. The Portland cement mortar for the brickwork shall be composed of one part of Portland cement to three parts by measure of sand. The materials to be mixed together on a proper stage, turned over and thoroughly incorporated with a sufficiency of water. The mortar is to be made in small quantities from time to time as required, and must be used within one hour of mixing.

Pipe points.

55. All pipe joints are to be made in neat Portland cement, which shall be prepared in small quantities as required, and used fresh.

Gravel.

56. To be approved pit gravel or Thames ballast. That used as aggregate for the concrete shall not exceed 2-in. gauge, with sufficient sand and fine stuff to fill the interstices, and shall be clean, and, if required by the Surveyor, shall be washed before use with cement. Should there, in the opinion of the Surveyor, be an insufficient, or too large a proportion of sand and fine stuff, the quantity or proportion shall be adjusted to his satisfaction.

Concrete.

57. The whole of the concrete used in the works to be composed of one part Portland cement and six parts of pit gravel or Thames ballast, as hereinbefore specified. To be prepared on a boarded platform of suitable size, sufficient to admit of the concrete being turned over the requisite number of times in one direction. The materials to be gauged in boxes of a size necessary to secure the proper proportion of the ingredients, which are then to be heaped together and turned over twice while in a dry state, once while being watered, and twice wet before being loaded

into barrows or cast into position. When mixing the ingredients the water is to be added in a careful manner and in limited quantities by being applied through a finely perforated nozzle, so as to obtain a thoroughly plastic and incorporated mass.

The concrete to be deposited in position immediately after being mixed in a wet state and thoroughly consolidated with heavy beaters.

The Contractor shall remove any concrete which has been damaged by heavy rains or otherwise, and shall cover up the work, wherever necessary to protect it from the weather.

Water. 58. The Contractor shall supply all water, which, for the works, must be perfectly fresh and clean.

Hardcore. 59. All hardcore to be composed of hard burned clinker or bricks, or other approved hard materials, free from dust, dirt, and plasterer's rubbish.

Pipes. 60. To be best London made salt-glazed stoneware, socket jointed pipes of   or   manufacture, well burned and glazed throughout, circular in section, smooth, straight, true in bore, and free from cracks and flaws of every description. All stoppers, &c., to be of similar material.

Gulleys, &c. 61. The whole of the gulleys and drainage connections to be   or   best quality salt-glazed stoneware, well burned and glazed throughout, smooth, uniform in shape, properly finished, and free from cracks and flaws of every description.

Ironwork. 62. The whole of the ironwork used in the works shall be of Messrs.   manufacture, to   Corporation pattern, and shall be free from cracks, flaws, blisters, slags, sand-holes or other defects, and shall be either painted or coated with Dr. Angus Smith's solution before being fixed.

Sewers and Surface-water Drains, &c.

Excavation. 63. The whole of the excavations for the drainage work are to be carried out to the depths, gradients, lengths and directions shown on the Plans, Sections and Detail Drawings. The bottoms of trenches to be formed and rammed to the shape of the pipes, and a groove cut across the trench and partially filled with clay for the reception of each socket of the pipes, so that the barrel of each pipe shall rest solidly on its bed.

The trenches shall in all cases be excavated wide enough to allow a space of six inches on either side of the collars of the pipes when properly laid.

All gas, water, and other mains or pipes, or other works uncovered during the excavation are to be carefully protected and supported. Make good any damage that may be done to them, and leave all sound and perfect at completion.

Sewers.

64. The Contractor shall lay 9-inch pipe sewers between the existing Manhole in Ville Road and Manhole No. 4.

These sewers are to be laid in the directions shown by thick black lines on Plan (Fig. 19) and to the lengths and inclinations indicated on the Longitudinal Sections shown on Plan (Fig. 20).

The Contractor shall include for connecting Manholes No. 3A and 4 with a 9-inch pipe for ventilation purposes.

Surface-water Drains.

65. The Contractor shall lay a 12-inch pipe surface-water drain between Manholes Nos. 1 and 5, in the direction shown by thick black lines on Plan (Fig. 19) and to the length and gradient indicated on the Longitudinal Sections shown on Plan (Fig. 20).

Mode of laying.

66. The sewers and surface-water drains are to be laid in straight lines, each pipe being properly boned in so as to secure a true and even gradient, and the barrel of each pipe shall rest solidly on its bed as specified in 'Excavation.'

All main drains are to be commenced at their point of outfall, the necessary junctions for the branch drains being inserted as the work proceeds.

Joints.

67. All joints shall be carefully made, solidly bedded, and jointed in neat Portland cement, the lower half of the socket being flushed with cement before the spigot is inserted, the whole circumference of the socket shall then be completely filled with cement and finished with a neat smooth bold collar of the same material on the outside of each joint. Special care to be taken that no cement or earth remain inside the pipes after jointing, and to ensure

their being clear, a close-fitting wad shall be drawn through each pipe as the work proceeds.

Testing.

68. No drain or sewer shall be covered in until it has been tested and finally approved by the Surveyor, and also by the Borough Surveyor to the Corporation.

After the drains and sewers are laid, a period of three days shall elapse before testing, so as to allow sufficient time for the joints to set.

The whole of the drains and sewers shall then be tested in convenient sections by hydrostatic pressure. The pipes in each section to be filled with water in such a manner as to subject the whole of the pipes and joints to a head or pressure of water not exceeding 5 feet in height. The necessary bends, &c., for fixing at the head of each section to obtain the specified pressure of water, shall be provided and fixed as required.

Connections to existing sewers.

69. The sewers and drains are to be connected to the existing sewers and drains where shown on Plan in such a manner as may be required by the Borough Surveyor, and the Contractor must pay all fees and other expenses in connection therewith.

Branch drains.

70. The Contractor shall lay 6-inch pipe branch drains to gulleys, on the lines shown on Plan, in the same manner, and jointed with the same material as the main drains. The special single 9″ × 6″ or 12″ × 6″ (as the case may be) oblique junctions to receive these branch drains being provided and fixed in the main drains as the work proceeds. The branch drains shall be kept 12 inches below the finished surface of the road at their highest point, and covered with 6 inches of concrete.

Filling.

71. On the approval by the Surveyor of each completed length of sewer or surface-water drain, the trench shall be carefully filled up to the height of the original surface with earth, in layers of not more than 9 inches in thickness. Each layer shall be carefully rammed, and shall if necessary be further consolidated by the addition of water, to be provided by the Contractor in such quantities as may be directed. Before any ramming is commenced the pipes shall be carefully packed underneath, and covered with one foot of selected fine dry material.

Gulleys.

72. The Contractor shall provide and fix in the positions

shown on Plan (Fig. 19), 10 glazed stoneware gulleys of or manufacture, 4 feet deep and 18 inches in diameter, with 6-inch outlet connected to the branch drains with cement joint. The gulleys shall have their upper portion, to a depth of 2′ 0″ below the level of the grating, surrounded by concrete, and shall be surmounted by a two-course brick seating, as shown on Detail Drawing.

Provide and bed in cement mortar on the brick seating Messrs. cast-iron gulley frames with hinged gratings, 22″ × 16″ outside size on top, and 6 inches deep, of similar weight and pattern to those at present in use by the Corporation (quoted List price £1 7*s.* 6*d.* each).

Each gulley grating to be surrounded by 5″ × 6″ Leicester granite pitching on a 6-inch bed of concrete, as shown on Detail Drawing.

73. The Contractor shall construct at the points marked on Plan, and at levels indicated in the sectional drawings, five sewer manholes and five surface-water manholes, of the form and dimensions shown on the Detail Drawings. The walls to be built up in brickwork to the full dimension shown on drawings, on 9-inch bed of concrete extending 4½ inches beyond the brickwork on all sides. Manholes.

The brickwork to be of good hard stocks, laid in cement mortar in English bond, with all face joints, except where left rough for rendering, thoroughly flushed up with cement mortar and neatly struck with the point of the trowel.

The chamber in the manholes is to be formed by partially roofing over with a 6-inch York stone cover, supported in front by a 4″ × 3″ rolled iron joist, as shown on the Drawings.

All pipes entering the Manholes are to have two ring arched openings formed for them so that they may be withdrawn without cutting, and to prevent fractures from settlements.

Build in the ends of all pipes at the heights and levels shown on the drawings, or as directed by the Surveyor during the progress of the work.

Build in Messrs. No. 223 malleable galvanized step irons (quoted List price 1*s.* 9*d.* each) at a height of every four courses of brickwork, where shown on Detail Drawings.

Manhole bottoms.

74. The channels passing through the Manholes are to be formed with half-section glazed open channels as manufactured by Messrs. or firmly embedded in concrete, laid to proper falls, and jointed in neat Portland cement. The channels to be of the sizes shown on the Detail Drawings, and to be straight, tapered or curved, as may be necessary.

The sides of the half-round invert channels are to be formed up perpendicularly in concrete, to a height above the invert equal to three-fourths the full diameter of the channel, and then benched off to the sides of the Manholes at a slope of one in four, the whole being rendered with $\frac{3}{4}$ inch of Portland Cement, with the addition of a small quantity of sand, trowelled to a smooth face, and carried up all round the sides of the Manholes to a height of 6 inches above the highest part of the benching. The arrises to the channels are to be slightly rounded.

The entrances to Manholes are to be corbelled over to the necessary openings for covers, as shown on drawings, and all iron cover frames are to be bedded and pointed in cement mortar.

Provide and fix to each sewer manhole Messrs. No. solid top manhole cover and frame with clear opening of 20 inches diameter (quoted List price £2 10*s*. 0*d*. each).

Provide and fix to each surface water manhole Messrs. ventilating manhole cover and frame with dirt box complete, and clear opening of 20 inches diameter (quoted List price £3 1*s*. 0*d*.).

All manhole bottoms are to be tested with water, to ensure that the joints between the channels, drains, and benchings are sound and perfect. A sufficient quantity of water shall also be poured down the branch sewers or drains, to ensure that the channels in the manholes are laid to proper curves and falls, so that the discharge from them shall not cause any splashing or backwash. Should any defects of this description be found, the channels must be taken up and rearranged as directed.

75. Provide and lay on 6-inch bed of concrete 4-inch

Kerbing round manholes.

Leicester granite cubes, in three courses, round manhole covers, as shown on Detail Drawings.

Ventilating shafts with inspection chambers.

76. The Contractor shall provide and fix, at the point marked on Plan, two of Messrs. , 6-inch sewer ventilating shafts, 30 feet in height above ground, complete with ornamental base, mouldings, coronet, and copper wire cage, &c. (Quoted list price £11 15*s*. 0*d*. each.)

The shaft to be carried 3′ 6″ below the finished surface of the footpath and to be firmly embedded in, and bolted to a block of concrete, as shown on Detail Drawing.

The Contractor shall also construct, adjoining the Ventilating-shaft, one Inspection Chamber in 4½-inch brickwork, with 6-inch concrete bottom extending a distance of 3 inches beyond the walls of the chamber on all sides.

The chamber to be constructed to the dimensions shown on Detail Drawing, and to have half-pipe channel bedded on the concrete bottom, with detachable half-pipe covers connecting up the stoneware conduit with the branch inlet to shaft.

Arches to be turned for reception of pipes, and the brickwork to be corbelled over to form openings to fit covers.

Provide and fix to Inspection Chamber one of Messrs. No. air-tight covers and frames, 24″ × 18″ clear opening. (Quoted List price 17*s*. 6*d*. each.)

Ventilating conduits.

77. Excavate for and lay 9-inch glazed stoneware socket-jointed pipe ventilating conduit from Manhole No. 3A to the Inspection Chamber to ventilating shaft, proper cement joints being made, and two ring arches turned in the Manhole for the reception of the pipes.

ROAD-MAKING.

Road formation.

78. The Contractor shall excavate or fill up, as the case may require, the existing ground to form carriage-ways and footways on the lines, levels, and inclinations indicated on the plans and sections; deposit sufficient suitable material for all filling, and cart remainder away. Form and trim slopes 1½ to 1.

The excavations and fillings to the formation level to be made to the exact contour of the finished roadway, as shown on the Detail Drawings. All filling up to be well rammed in 9-inch layers and further consolidated by the addition of water, to be applied in such quantities as the Surveyor may direct. After formation to shape, the surface of ground of the carriage-way shall be thoroughly rolled with a roller weighted up to 2 tons, and the surface of ground of the footways with a 1-ton roller, any depressions which may appear during the process of rolling being filled up with suitable hard material. The rolling to be repeated until in both cases the ground is thoroughly consolidated to the shape, levels, and inclinations shown on the Plan, Sections, and Detail Drawings.

Hardcore.

79. On the road bed thus formed the Contractor shall lay a bed of approved hardcore 12 inches in thickness, and applied in two layers; the pieces forming the bottom layer are not to exceed 9 inches in size, measured in any one direction, and the whole shall be thoroughly consolidated to the contour of the finished surface with a 7-ton roller, the thickness of the bed to be 12 inches after consolidation.

Intermediate layer.

80. On the hardcore foundation shall then be deposited an intermediate layer 3 inches in thickness, of coarse road gravel of good hard, clean, and binding quality, screened through a sieve having $\frac{5}{8}$-inch meshes, and all large stones being broken so that the whole will pass a $2\frac{1}{2}$-inch ring.

This intermediate layer is to be thoroughly and evenly rolled with a 10-ton roller, and shall be 3 inches in thickness after consolidation.

Final layer.

81. The final layer shall be uniformly spread over the intermediate layer, and shall consist of approved fine gravel rolled down to a thickness of 3 inches.

Finished surface.

82. The whole of the roadway shall be thoroughly consolidated with a 10-ton steam roller, until a perfectly compact and even surface is obtained to the contour shown on the Detail Drawings.

Footpaths.

83. After being properly consolidated as before specified, the bed of the footpaths shall receive a 6-inch layer of approved hardcore, laid to a fall of $\frac{1}{2}$-inch to every foot towards the roadway, and thoroughly rolled with a heavy hand roller.

On the hardcore bed shall then be uniformly spread a layer of good bright hoggin, which shall measure 3 inches in thickness after consolidation with a heavy hand roller.

84. The Contractor shall excavate for, provide, and lay in the positions indicated by dotted lines on the outer sides of the footpaths on Plan, Norwegian granite kerb, 12 inches on face and 6 inches in depth, properly bedded on concrete 15 inches in width and 6 inches thick. The kerb to be well squared and jointed with cement mortar, and afterwards pointed up in neat cement. No length shall be less than 2 feet 6 inches, and the top and front shall be properly tooled and dressed. Kerbing.

All circular kerbing shall be truly laid to required radius.

85. Excavate for, provide, and lay as specified for kerbing, three courses of 5″ × 6″ Leicester granite pitching to form channelling, set in cement on 6-inch concrete bed, as shown on Detail Drawings, well grouted and laid to necessary falls at corners of new, or junctions with existing roads, as may be required or directed. Channelling.

The granite pitching is to be carried round the gratings to road gulleys as shown on Detail Drawing.

86. Provide and fix in the positions shown on Plan, seven lamp columns with lanterns and cradles complete of Messrs. manufacture aud of similar weight and pattern to those now used by the Corporation (quoted List price £3 5*s.* 0*d.* each). Lamp posts.

The lanterns and cradles to be taken care of and deposited at the Corporation Yard.

87. The Contractor shall include a provisional sum of £50 for contingencies or extras other than those elsewhere provided for, and which may be ordered in writing by the Surveyor, and such sum, if not utilised, is to be deducted from the amount of the Contract in whole or in part as the case may be. Provisional sum.

THE .... ESTATE

Bill of Quantities for Materials to be supplied and Works to be performed in the formation of Proposed Roads, and in the construction of Sewers and Surface Water Drains, for E—— F——, Esq.

Surveyor,
10 C—— Street,
London.

May 19——

Preliminaries.

These quantities have been taken out with care for the convenience of the Contractor, who is at liberty to examine and measure off from the Drawings himself, or to inspect the Abstracted quantities to test their accuracy. The Employer does not hold himself responsible for any inaccuracy, misdescription, insufficiency or otherwise, and no allowance will be made for such after the acceptance of the tender.

The Contractor shall, before signing the Contract, fill up, sign and deliver to the Surveyor, a 'Schedule of Prices' which shall be similar to that upon which his tender is based.

To all items in this Bill persons tendering must put prices, and compute the full money value of same.

The Contractor in making out his Tender is particularly requested to refer to the full Specification for all details, as the brief descriptions given below are merely intended for his assistance in identifying such details.

The Plans, Sections and Detail Drawings may be seen at the offices of the Surveyor, 10 C——— Street, London, and persons tendering are requested to carefully inspect them, and also to visit the site of the proposed works.

Any greater or less quantity of work than is provided for in the Bill of Quantities and Specification, which may be executed or omitted in accordance with the terms of the Contract, shall be measured up and paid for in addition to the amount of the

Tender, or deducted therefrom as the case may be, in accordance with the Contract prices attached to items in this Bill of Quantities.

The Employer does not bind himself to accept the lowest or any Tender.

Include for the provision of all materials of every description specified, all manual and team labour, all tools, tackle, plant, implements, and everything requisite and necessary to carry out, and complete the works in a proper and expeditious manner.

Include for indemnifying the Employer against all payments for accidents or damages which may arise from carrying out the Contract.

Include for taking out and replacing any defective work or materials.

Include for giving all notices and paying all fees.

Include for interference with gas, water and other mains, field drains, sewers, &c.

Include for superintendence of workmen by a competent foreman.

Include for pumps and appliances for keeping the excavations clear of water.

Include for timbering and shoring to sides of excavations.

Include for all centering, &c., to brick arches.

Include for testing all sewers and drains and manhole bottoms, as specified.

(The Contractor to be responsible for the correct setting out of the works, and to provide all pegs, posts, sight rails, and labour, to assist the Surveyor in checking and measuring up the same.)

(The Surveyor may order the works to be suspended for any length of time, should he deem it advisable.)

Include for making good damage to roads and footways, &c., by cartage of materials or plant.			
Include for making good damage or injury to the works by storm or otherwise, until they are handed over.			
Include for watching, guarding, and lighting necessary during progress of works.			
Provide land for storage of materials.			
Include for temporary office, &c., as specified.			
Include for any trial holes or trenches required.			
Include for clearing away all debris from time to time, and leaving all roads and footways clear at completion.			
Include for providing all water required throughout the works.			
Include for mixing boards, gauging boxes, &c.			
Include for providing tips for debris and surplus earth.			
Include for completing the works within three months after notice to commence.			
Include for maintenance of works for a period of six months.			
Include provisional amount for lithographing specification, quantities, &c., and drawings	£12	0	0
Include the sum of £50 for contingencies to be deducted if not required. *Note.* The Contractor to have no claim upon this item except upon the written order of the Surveyor	50	0	0
Carried to Summary	£62	0	0

SEWERS.

240 feet lin^{l.} Excavating for in open cutting about 5′ 6″ deep, and laying 9″ socket

jointed pipe sewer (best pipes) and include for jointing in cement, filling in and ramming, and spreading surplus earth, as per Plan, Sections, and Specification @ 2*s.* 9*d.*	£33	0	0
300 feet lin$^{l.}$ Do. do. 9″ pipe sewer, average depth about 6′ 0″, as per Plan, Sections, and Specification @ 3*s.* 0*d.*	45	0	0
300 feet lin$^{l.}$ Do. do. 9″ pipe sewer, average depth about 6′ 9″, as per Plan, Sections, and Specification @ 3*s.* 3*d.*	48	15	0
265 feet lin$^{l.}$ Do. do. 9″ pipe sewer, average depth about 5″ 9″, as per Plan, Sections, and Specification @ 2*s.* 10*d.*	37	10	10
60 feet lin$^{l.}$ Excavating for in open cutting about 2′ 3″ deep, and laying 9″ socket jointed pipe conduit (London pipes) for ventilation between Manholes Nos. 3A and 4, and include for jointing in cement, filling in and ramming and spreading surplus earth on site, as per Plan, Sections, and Specification . @ 2*s.* 3*d.*	6	15	0
No. 5. Excavating for, filling in and ramming round, and spreading surplus on site, and constructing of 9″ brickwork in cement mortar Manholes Nos. 1, 2, 3, 3A and 4, each about 6′ 6″ deep to invert, on 9″ concrete foundations extending 4½″ beyond brickwork on all sides, and include for forming bottoms, laying glazed stoneware channel, turning arches for pipes, benching and rendering with cement. Build in Messrs. malleable galvanised step irons (quoted List price 1*s.* 9*d.* each) every four courses of brickwork apart, include for 6″ York stone cover to chamber, supported in front by rolled iron joist, corbel over brickwork, and provide and fix Messrs. No. solid cover and frame (quoted List price £2 10*s.* 0*d.*			
Carried forward	£171	0	10

Brought forward	£171	0	10
each) as per Plan, Sections, Detail Drawings, and Specification .. .. @ £10	50	0	0
No. 2. Extra only to Manholes Nos. 3A and 4, turning arches for ventilation pipes @ 5*s.*		10	0
No. 1 Extra only to Manhole No. 4, extra over straight special single oblique junction channel and extra labour @ 2*s.* 6*d.*		2	6
Include for breaking into the existing sewer manhole in Ville Road, and connecting thereto 9″ pipe sewer to the satisfaction of the Borough Surveyor, and reinstating surface of road, &c.	1	0	0
15 feet lin$^{l\cdot}$ Excavating for in open cutting, average depth about 3′ 0″, and laying 9″ socket-jointed pipe conduits (or pipes) to ventilating shafts from Manhole No. 3A, and include for jointing in cement, filling in and ramming, and spreading surplus earth on site, as per Plan, Sections, and Specification @ 2*s.* 3*d.*	1	13	9
No. 1. Excavating for, filling in and ramming round, and spreading surplus on site and providing and fixing in block of concrete, as shown on Detail Drawing, 6″ *ventilating column* of Messrs. manufacture, 30 feet in height above ground level, complete with branch inlet, cast iron base, ornamental moulding and coronet with copper wire cage (quoted List price £11 15*s.* 0*d.* each). As per Plan, Detail Drawing, and Specification .. @ £14 10*s.*	14	10	0
No. 1. Excavating for, filling in and ramming round, and spreading surplus on site, and constructing of 4½″ brickwork in cement mortar, inspection chamber to ventilating column, 2′ 0″ deep, and include for 6-inch concrete bottom and foundations extending 3″ beyond brickwork on all sides, and			
Carried forward	£238	17	1

Brought forward	£238	17	1
laying glazed stoneware ½ pipe channel with detachable ½ pipe cover. Turn arches for pipes and provide and fix Messrs. No. airtight inspection cover and frame 24″ × 18″ clear opening, (quoted List price 17*s.* 6*d.* each) @ £2 10*s.*	2	10	0
Carried to Summary	£241	7	1

SURFACE-WATER DRAINS.

309 feet lin$^{l.}$ Excavating for, in open cutting average depth about 4′ 0″, and laying 12″ socket jointed pipe surface-water drain (or best London pipes) and include for jointing in cement, filling in and ramming, and spreading surplus earth on site, as per Plan, Sections, and Specification .. .. @ 3*s.*	46	7	0
795 feet lin$^{l.}$ Do. do. 12″ pipe surface-water drain, average depth about 4′ 9″, as per Plan, Sections, and Specification .. .. @ 3*s.*	119	5	0
No. 10. Extra only on straight for 12″ × 6″ single oblique junctions for gulley connections .. .. @ 2*s.* 6*d.*	1	5	0
No. 2. Excavating for, filling in and ramming round, and spreading surplus earth on site, and constructing of 9″ brickwork in cement mortar, Manholes Nos. 1 and 2, each about 5′ 0″ deep to invert, on 9″ concrete foundations extending 4½″ beyond brickwork on all sides and include for forming bottoms, laying glazed stoneware channel, turning arches for pipes, benching and rendering with cement. Build in Messrs. No. malleable			
Carried forward	£166	17	0

Brought forward	£166	17	0
galvanised step irons (quoted List price 1*s.* 9*d.* each) every four courses of brickwork apart, include for 6″ York stone cover to chamber supported in front by rolled iron joist, corbel over brickwork, and provide and fix Messrs. ventilating covers and frames, with dirt box complete (quoted List price £3 1*s.* 0*d.* each), as per Plan, Sections, Detail Drawings and Specification .. .. @ £9	18	0	0
No. 2. Excavating for, filling in and ramming round, and spreading surplus earth on site, and constructing of 9″ brickwork in cement mortar, Manholes Nos. 3 and 4, each about 5′ 6″ deep to invert, complete in every detail and similar in construction to Manhole No. 1 (described herein), and include for Messrs. ventilating covers and frames with dirt box complete (quoted List price £3 1*s.* 0*d.* each), as per Plan, Sections, Detail Drawings, and Specification .. .. @ £9 10*s.*	19	0	0
No. 1. Excavating for, filling in and ramming round, and spreading surplus earth on site, and constructing of 9″ brickwork in cement mortar, Manhole No. 5 about 6′ 0″ deep to invert, complete in every detail and similar in construction to Manhole No. 1 (described herein), with extra arch for 9″ pipe and special taper single oblique junction channel, and include for Messrs. ventilating cover and frame with dirt box complete (quoted List price £3 1*s.* 0*d.*), as per Plan, Sections, Detail Drawings, and Specification .. @ £10	10	0	0
168 feet lin^{l}. Excavating for in open cutting, average depth about 2′ 9″, and laying 6″ socket jointed pipe branch drains to			
Carried forward	£213	17	0

Brought forward	£213	17	0
gulleys, to be kept 12″ from finished surface of road at their highest point and covered with 6″ of concrete. Include for the necessary bends, &c., and jointing in cement, filling in and ramming and spreading surplus earth on site, as per Plan, Sections, and Specification .. .. @ 2*s.*	16	16	0
No. 10. Excavate for, fill in and ram round, and provide and fix or glazed stoneware gulleys, 18″ diameter and 4′ 0″ deep, in the positions shown on Plan (Fig. 19); surround with concrete to a depth of 2′ 0″ below level of grating and provide and set in cement mortar on brick seating Messrs. No. gulley grates and frames (22″ × 16″ outside measure of frames by 6″ deep), quoted List price £1 7*s.* 6*d.* each, as per Plan, Detail Drawings, and Specification .. @ £4 10*s.*	45	0	0
Carried to Summary	£275	13	0

ROADMAKING.

Grub up fences on line of Works and stack posts and rails where directed, carefully removing gate and posts and taking care of same ..	2	0	0
3500 feet super. Soil stripping, average depth 12″, and forming bed of carriage-ways and footpaths, as per Plan, Sections, and Specification, and spreading surplus on site, including for trimming slopes $1\frac{1}{2}$ to 1, @ 4*d.*	58	6	8
6140 feet super. Rolling and thoroughly consolidating the formation level of carriage-ways and footpaths, watering where necessary, and filling up all depressions with suitable material, and include for trimming			
Carried forward	£60	6	8

Brought forward	£60	6	8
slopes 1½ to 1, as per Plan, Sections, and Specification .. .. @ 1*d.*	25	11	8
2074 feet lin^{l}. Excavating for, providing and laying 12″ × 6″ Norwegian granite kerb, straight bedded on 15″ × 6″ of concrete, and include for jointing with cement mortar and pointing with cement, as per Plan, Detail Drawing, and Specification.. @ 1*s.* 9*d.*	181	9	6
36 ft. lin^{l}. Excavating for, providing and laying 12″ × 6″ Norwegian granite kerb, circular, bedded on 15″ × 6″ of concrete and laid to a radius of 8′ 0″. Include for jointing in cement mortar, and pointing with cement, as per Plan, Detail Drawing, and Specification .. .. @ 2*s.* 3*d.*	4	1	0
2110 ft. lin^{l}. Provide and lay channelling of 5″ × 6″ Leicester Granite pitching, laid in three courses on 18″ × 6″ bed of concrete, and include for grouting in cement. The pitching to be carried round gulley gratings as shown on Detail Drawing, this being measured in as three courses straight, as per plan, Detail Drawing, and Specification .. .. .. at 1*s.* 9*d.*	184	12	6
18 feet super. 4″ Granite Cubes on 6″ bed of Concrete laid in 3 courses round manhole covers, as per Detail Drawing and Specification .. .. @ 12*s.*	10	16	0
1125 feet cube. Providing and spreading approved Hardcore on carriage-ways 12″ thick, in two layers, as per Drawings and Specification .. .. .. @ 4*s.* 4*d.*	243	15	0
(*Note*—This quantity is measured net after consolidation.)			
352 feet cube. Providing and spreading approved hardcore to form foundations of footways, 6″ in thickness, quantity			
Carried forward	£710	12	4

Brought forward	£710	12	4
measured net after consolidation, as per Drawings and Specification .. @ 4*s*.	70	8	0
282 feet cube. Providing and spreading coarse gravel 3″ thick over hardcore, quantity measured net after consolidation, as per Drawings and Specification .. @ 6*s*.	84	12	0
282 feet cube. Providing and spreading approved road gravel 3″ thick over intermediate layer, quantity measured net after consolidation, as per Drawings and Specifition .. .. @ 6*s*.	84	12	0
176 feet cube. Providing and spreading on footways approved hoggin 3″ thick, quantity measured net after consolidation, as per Drawings and Specification .. .. @ 6*s*. 6*d*.	57	4	0
3440 feet super. Rolling and consolidating bed of hardcore on carriage-ways, in two layers, as per Specification .. @ 1*d*.	14	6	8
3440 feet super. Rolling and consolidating the two layers of gravel on carriage-ways, as per Specification .. .. @ 1*d*.	14	6	8
2112 feet super. Rolling and consolidating hardcore foundation and layer of hoggin to footways, as per Specification .. @ 1*d*.	8	16	0
No. 7. Provide and erect in positions shown on Plan (Fig. 19) pattern Lamp Columns complete with lamps and Cradles, &c., of Messrs. manufacture (List price, £3 5*s*. 0*d*. each), and as per Specification .. .. .. @ £4 0*s*. 0*d*.	28	0	0
Carried to Summary	£1072	17	8

SUMMARY.

	£	s.	d.
Preliminaries	62	0	0
Sewers	241	7	1
Surface-water Drains	275	13	0
Roadmaking	1072	17	8
	£1651	17	9
Surveyor's Fees for Bill of Quantities, measuring up for Certificates, &c. @ 5 %	82	11	11
Total	£1734	9	8

SCHEDULE OF PRICES.

Referred to in the General Conditions and forming part of the Contract, and must be filled up at the same rate, and on the same basis as the Bill of Quantities.

The prices for all material must include delivery on the site, and the price for labour must be inclusive of all supervision by the Contractor or his Foreman, and use of tools. Proportionate rates are to be charged for lesser quantities than are specified.

Per yard super. Soil stripping not exceeding 12 inches in depth, and spreading on site	4*d.*
Per yard cube. Excavating in clay, including expense of keeping works clear of water, and carting 250 yards and spreading	2/–
Per yard cube. Do. do. but wheeling in barrows one run, and spreading	2/–
Per yard cube. Extra only to ramming in 9″ layers with 10 lb. iron punners	2/3
Per yard cube. Brick rubbish picking and spreading	4/6
Per yard cube. London hardcore do. do.	6/–
Per yard cube. Coarse gravel, as per Specification, and spreading	6/–

Per yard cube. Fine gravel and spreading	6/6
Per yard cube. Hoggin do. do.	7/–
Per yard cube. Concrete do. do.	16/–
Per yard cube. Do. do. and as per detail drawings, under kerbs and channels	16/–
Per yard super. Cement rendering $\frac{3}{4}''$ thick	3/–
Per rod super. Reduced brickwork in manholes and inspection chambers in cement mortar	20/–/–
Per yard cube. 6″ York stone covers to manhole chambers	70/–
Per foot run. Laying pipe sewers, surface-water drains, branch drains, complete, including digging as per Specification, as follows :—	

15-in. Pipe.		12-in. Pipe.		9-in. Pipe.	
Feet deep.	@	Feet deep.	@	Feet deep.	@
3	3/6	3	2/9	3	2/–
4	3/9	4	3/–	4	2/3
5	4/–	5	3/1	5	2/6
6	4/2	6	3/3	6	2/8
7	4/4	7	3/7	7	2/10
8	4/6	8	3/9	8	3/–
9	4/8	9	3/11	9	3/2
10	5/0	10	4/1	10	3/4

Each.	Extra on straight 12″ × 6″ junctions	5/–
,,	Do. 9″ × 6″ do.	2/6
,,	Do. 12″ bends do.	2/6
,,	Do. 9″ do.	2/–
,,	Do. 6″ do.	1/6
,,	Stoneware gulleys 4′ 0″ × 1′ 6″ and fixing	60/-

Each. Gulley gratings as specified and fixing	30/–
Each. Manhole covers (solid) do.	70/–
,, Do. (ventilating) do.	85/–
,, Inspection covers do.	45/–
Per yard super. 4″ Leicester granite cubes to crossings grouted in cement	12/–
Per yard super. Do. do. round manhole covers	12/–
Per foot run. 5″ × 6″ Leicester granite pitching in 3 courses grouted in cement	1/9
Per foot run. Norwegian granite curb 12″ × 6″ flat jointed and pointed in cement	1/9
Per foot run. Norwegian granite kerb radiated	2/0
Per yard super. Rolling hardcore as specified	1*d.*
Per yard super. Do. intermediate layer of gravel do.	1*d.*
Per yard super. Do. finished surface of roadway do.	1*d.*
Per foot super. 1½″ Deals left in trenches	2½*d.*
Per foot cube. Fir timbers do.	2/6
Per foot run. Fir in poles do.	4*d.*
Per foot run. 12″ × 12″ × 2″ deals left in trenches	6*d.*
Per foot super. ¾″ rough Elm boards	3*d.*
Per bushel. Portland cement as specified	1/9
Per bushel. Sand as specified	9*d.*
Per 1000. Stock bricks do.	45/–
Per 1000. Extra to radiated bricks	10/–
For 1st day and night. Fencing and other hoards, cartage to and from the works, fixing and use of close boarding not exceeding 12 feet long × 6 feet wide	15/–
For each day and night. Do. do. beyond first day and night	5/–
For 1st day and night. Strong fences of posts and rails same dimensions	20/–
For each day and night. Do. do. beyond first day and night	10/–
Use of four large size lanterns and light	1/–

Per hour.	Bricklayer	1/-
,,	Carpenter	1/-
,,	Mason	1/1
,,	Navvy	8½*d.*
,,	Labourer	8*d.*
Per day or night.	Watchman	5/-
Per day.	Use of one horse and cart and man	11/-

THE . . . . ESTATE.

Proposed New Road and Sewers.

Form of Tender

(to be delivered not later than noon on the day of 19 at the Offices of the Surveyor)

To Mr.
Surveyor,
10 C—— Street,
London.

Sir,

hereby undertake and agree to perform the whole of the works, and provide all labour and materials in accordance with the General Conditions and Specification hereto annexed, and indicated on the Plans, Sections and Detail Drawings, and to leave the whole of the works included or implied in the Specification and Bill of Quantities complete to your satisfaction, and to maintain the same for a period of six months after completion for the sum of One thousand seven hundred and thirty-four pounds nine shillings and eight pence.

£1734 9*s.* 8*d.*

As witness hand this day of
One thousand nine hundred and

Name

Address

Short form of Contract applicable to the formation of Park Road described in the preceding Specification, General Conditions, and Bill of Quantities.

Memorandum of Agreement made the day of 19 . Between of in the County of Kent (hereinafter called the Contractor) of the one part, and E—— F—— of in the County of , Esquire (hereinafter called the Employer) of the other part.

Whereby it is agreed as follows :—

1. In consideration of the sum hereinafter provided to be paid by the Employer, the Contractor hereby agrees to execute, carry out and complete the whole of the Works required to be done in Constructing Sewers and Surface Water Drains, and in the formation of a section of the new road with footpaths to be known as the Park Road, extending in a northward direction from Ville Road at in the County of as shown on Plan and sectional drawings hereinafter referred to, such road and footpaths being coloured on the said Plan, within the time, upon the terms, and in strict accordance with the General Conditions, Specification, Bill of Quantities, Schedule of Prices, and Form of Tender, the said Plan, together with the sections and Detail Drawings signed by the Contractor, and by Mr. A—— B—— the Surveyor of the Employer respectively, and the Contractor shall observe and perform the whole of the general conditions above referred to. The Work to be carried out under the superintendence and to the entire satisfaction of the said Mr. A—— B——, the Surveyor for the Employer, for the sum of One thousand seven hundred and thirty-four pounds nine shillings and eight pence (£1734 9*s.* 8*d.*).

2. Of the said sum of £1734 9*s.* 8*d.* the sum of £50 is provided for any contingencies or extras (other than those provided for in the Specification and Bill of Quantities) which may be ordered in writing by Mr. A—— B——. And it is hereby agreed that if the contingent sum of £50 or any part thereof shall not be utilised, then the whole or the unused part thereof, as the case may be, shall be deducted from the Contract price.

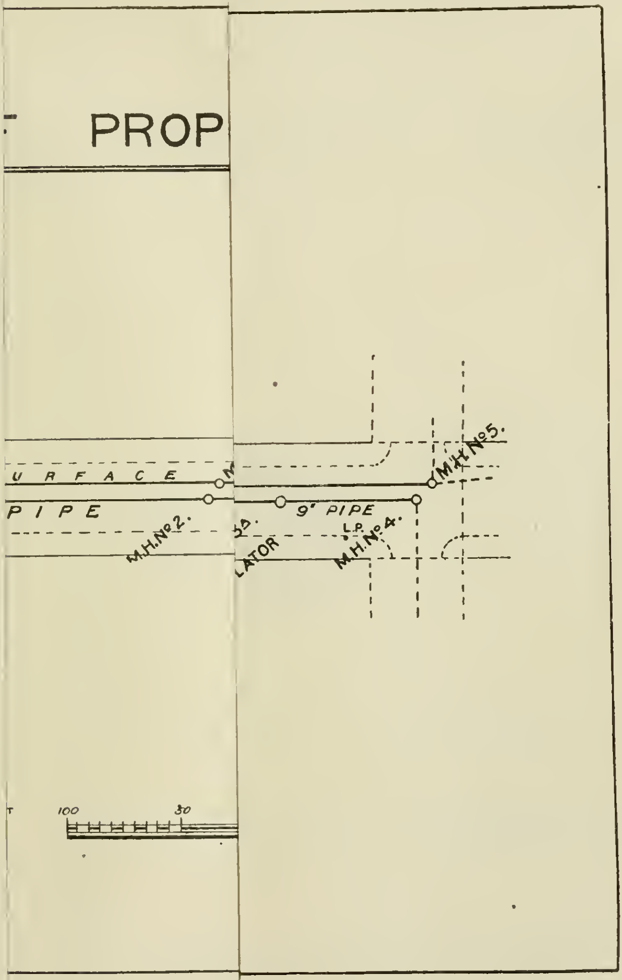


Fig. 19.

(To come between pp. 298 and 299.)

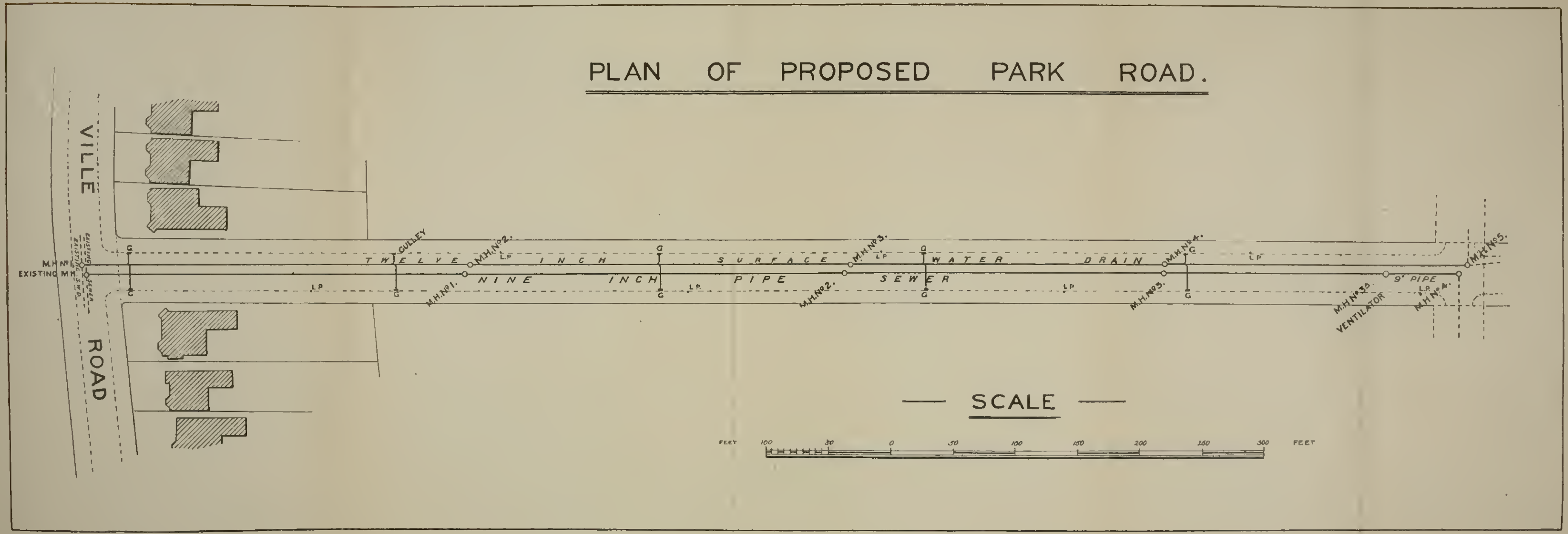
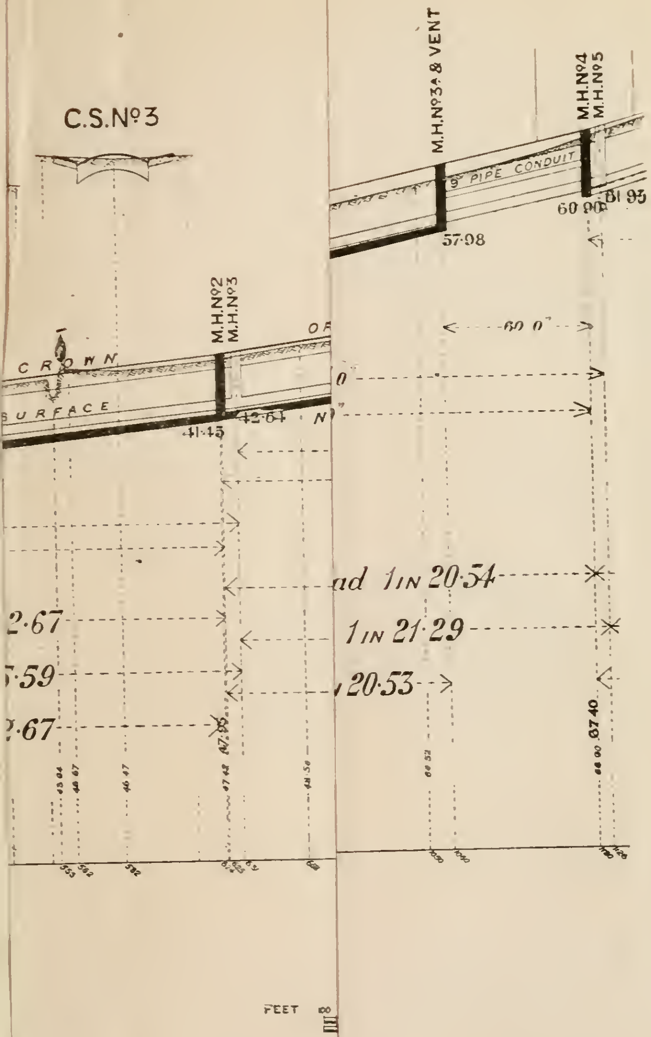


Fig. 19.

(To come between pp. 298 and 299.)



IG. 20.

(To come between pp. 298 and 299.)

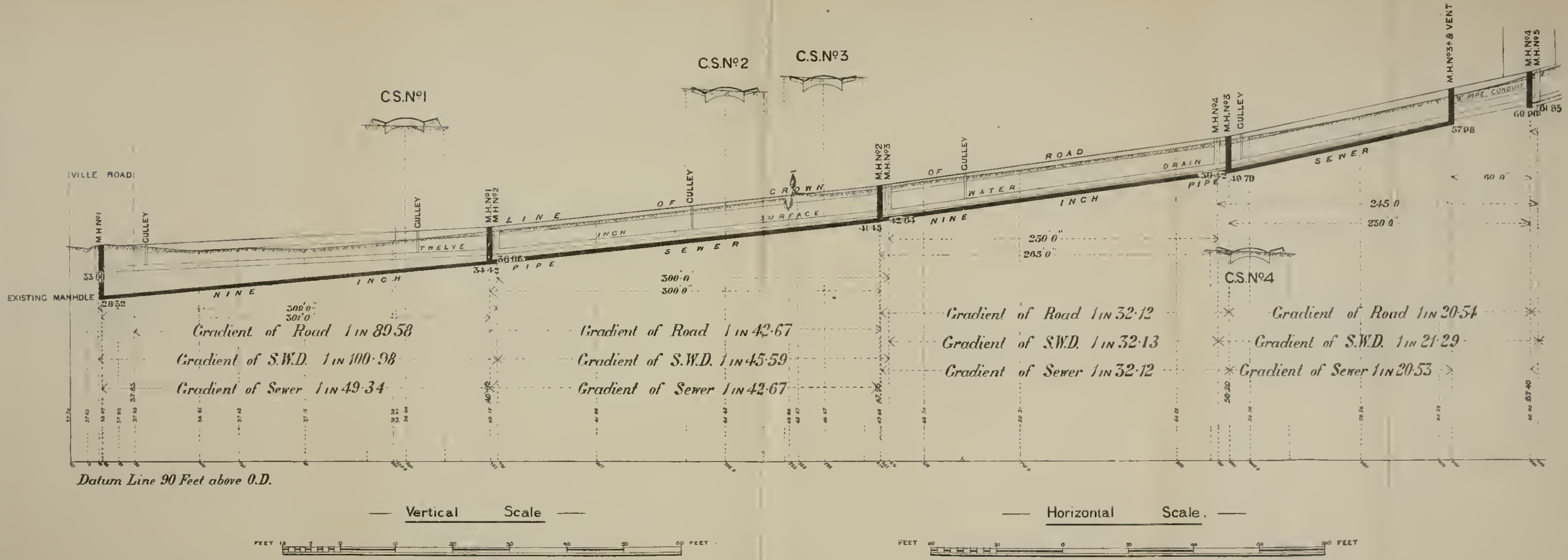


Fig. 20.

(To come between pp. 298 and 299.)

3. The said sum of One thousand seven hundred and thirty-four pounds nine shillings and eight pence (£1734 9*s.* 8*d.*) shall be paid by the Employer to the Contractor at the times and in the manner provided by the said General Conditions.

As witness the hands of the parties.

A Contract to execute any work upon land, whether it is or is not combined with an obligation to supply materials, is not enforceable unless it is in writing or print, and contains the names of the parties, and is signed by the party against whom it is sought to be enforced, or his duly authorised agent.

The stamp duty on such Contract, the matter of which is of the value of £5 or upwards, *when under hand only*, is sixpence; but *when under seal* it is ten shillings, such stamp duty to be paid either before, or within thirty days after execution.

APPENDIX B

Form of Agreement for a Building Lease where the Roads have been formed and sewers laid, and with provisions for Advances. In some cases, however, a mortgage is executed as an additional security for repayment.

Articles of Agreement made the
day of One thousand nine hundred
and Between of
in the County of Esquire
on behalf of himself his heirs executors administrators and assigns (hereinafter referred to as 'the Lessor') of the one part, and of
in the County of on behalf of himself his heirs executors administrators and assigns (hereinafter referred to as 'the Lessee') of the other part.

Lessor's covenants.

In consideration of the rent conditions and covenants within named,

1. The Lessor hereby agrees to let and the Lessee hereby agrees to take on lease ALL THAT plot of land situate on the
in the Parish of in the said County of
as the same with the several boundaries thereof is more particularly described in the plan annexed to these presents and thereon coloured dark pink, for a term of ninety-nine years from the day of One thousand nine hundred and subject to the following rents (that is to say)—[at five shillings for the first year, five pounds for the second year, one hundred pounds for the third year, and two hundred pounds, per annum, for the remainder of the term], such rents to be payable and paid by equal quarterly payments on the usual quarter days

the first quarterly payment of the said rent of £
to be made on One thousand
nine hundred and

Outgoings.

2. The said rents respectively to be paid free from any deductions in respect of any present or future land tax (if any), tithe, or assessment or outgoing whatsoever now chargeable or hereafter to be charged on the said premises or on the Landlord or Tenant in respect thereof by authority of Parliament or otherwise howsoever, (the Landlord's property tax in respect of the said rents only excepted) and all such outgoings shall be paid by the Lessee.

Granting of leases.

3. As soon as the Lessee has erected and covered in any of the said messuages or dwelling-houses and completed the drains and fence walls or fences thereof to the satisfaction of the Lessor's Surveyor, and has paid the rent then due and observed and performed this agreement in all respects up to that time, the Lessor will grant to the Lessee and the Lessee shall without requiring the production of the title of the Lessor accept and execute a counterpart of a separate Lease of each of the said messuages or dwelling-houses so erected and covered in with the appurtenances, each such Lease to be in accordance with the form of Lease in use on the estate of the Lessor but with such variations adapted to the state of the premises and otherwise as circumstances may render necessary.

Apportionment of rent.

4. On the granting of each Lease as hereinbefore provided the said rents shall be apportioned in such manner as shall be approved by the Lessor and so that in no case shall any such apportioned rent exceed an amount equal to one-fifth of the rack rental value of the messuage and premises to be included in such Lease.

Rights on adjoining land.

5. The Lessor shall be at liberty at any time or times to erect such messuages buildings walls and fences and to any height as he shall think fit on any part of the Lessor's land adjacent or adjoining to the said plot of land hereby agreed to be appointed and demised.

Lessee's covenants.

6. The Lessee doth hereby contract and agree with the Lessor in manner following (that is to say)—

That the Lessee will accept such Lease so to be granted as aforesaid, and will duly execute a counterpart thereof and will pay the costs, charges, and expenses of and incidental to such Lease and Counterpart, and will also duly observe and perform all and singular the following clauses and conditions of this Agreement namely :—

Payment of rent.

I. Will duly pay to the Lessor the rent or sum of money hereinbefore agreed to be reserved free from all deductions as aforesaid in manner and on the days and times hereinbefore appointed for payment thereof, and in default of such payment it shall be lawful for the Lessor to distrain for the same without prejudice to his right to put an end to this Agreement.

Period of construction.

II. Will commence the aforesaid works within two months from the date hereof, and within the respective periods and in the manner hereinafter mentioned at his own expense build and completely finish with proper materials and workmanship to the satisfaction and approval of the Lessor's surveyor upon the said plot of land in accordance with the Bye-laws and Regulations of the C
of   or other duly constituted authority,
messuages or dwelling-houses
with all suitable and necessary drains, fence and other walls, fittings, fixtures and appurtenances, and shall lay out the ground in front and at the rear of the said dwelling-houses respectively as gardens. Each of such dwelling-houses to be of the nett first cost in materials and labour of £
at the least, [three] of such dwelling-houses to be erected and completed within one year of the date hereof, [three] more of such dwelling-houses to be erected and completed within the second year, and the remainder on or before the end of the fourth year respectively, from the date hereof.

Plans.

III. Will not erect a building of any kind on the said plot of land until the site and frontage lines of such building and the plans of each floor with sections and elevations, and a general specification of the materials which it is proposed to use in its construction shall have been previously submitted to and approved in writing by the Lessor's surveyors, and no alteration shall subsequently be made in the site or in the so described method of construction of such building without the written consent of such surveyors. And will, upon submitting the plans, sections, elevations, and specification of every new building, also deposit with such surveyors a duplicate set of copies of such drawings and pay to the said surveyors a fee of two guineas for examining the same, but in the event of more than one building being erected from the same drawings and specification the fee shall be half a guinea for each building subsequently erected from such drawings and specification. And will not construct more than six adjacent houses from one design and in similar materials.

Temporary structures.

IV. Will undertake that no temporary or portable structure of any kind other than such as may be requisite for the carrying out of any work hereby permitted to be performed shall at any time be erected or placed upon the said plot of land without the Lessor's consent in writing, which consent shall be entirely discretionary.

Restrictions.

V. Will not burn any clay or other earth, nor make bricks or tiles on any part of the said premises nor dig any gravel or sand (except what may be required for the paths of the gardens in the said premises, or for use in the building of the said dwelling-houses) nor cut any timber or other trees without the surveyor's consent, and will not excavate the ground except so far as may be necessary for the foundations of the said intended dwelling-houses, fences, drains, and other works.

Deposit of materials.

VI. Will not deposit any building materials upon any part of Road shown on the said plan.

User of premises.

VII. Will not use or permit to be used any dwelling-house to be erected on any part of the said premises for a school or asylum for invalids, or for any trade or business whatsoever, or for any other purpose than as a private dwelling-house only, except
nor permit clothes to be dried in the gardens of the said premises or do or permit any act matter or thing to be done in or upon the said premises which may be or grow to the injury or annoyance of the Lessor or his Tenants of any adjacent or adjoining premises or of the neighbourhood.

Road maintenance.

VIII. Will from time to time and at all times when required so to do during the continuance of the term hereby agreed to be granted pay to the Lessor a fair share of the cost of maintaining and repairing Road aforesaid, and the footpaths, sewer, and drains belonging thereto until the said road shall be taken over by such local authority as aforesaid, such share to be determined in all cases by the surveyor for the time being of the Lessor whose decision shall be final and binding on all parties, and whose charges in respect thereof shall also be paid by the Lessee.

Insurance.

IX. Will when and so soon as the said dwelling-houses or any of them shall be roofed in insure the same in the Fire Insurance Office or in some other insurance office to be approved in writing by the Lessor in the joint names of the Lessor and of the Lessee to the amount of not less than three-fourths of the value thereof, and thenceforth keep the same so insured, and will at the request of the Lessor produce to him or his surveyor the policy or policies of such insurance and the receipt for the then current year's premium, and in default thereof that the Lessor shall be at liberty (if he shall think fit) to insure the said premises to the extent before indicated and shall be repaid all costs and expenses attending such insurance by the Lessee on the next quarterly day for payment of rent.

Lessee's payments.

X. Will pay for the preparation and execution of this Agreement and a counterpart thereof the sum of £3 3*s.* and pay to the surveyors of the Lessor the sum of £2 2*s.* on the signing of these presents for drawing plans therefor and for staking out the land, and the sum of £3 3*s.* on the granting of each Lease for preparing and drawing the plans on the Lease and counterpart and certifying that such Lease may be granted. Will also pay all district and Corporation surveyors' and other lawful fees and charges incidental to the buildings and works at aforesaid payable under any Act of Parliament for the time being in force or otherwise howsoever.

MUTUAL COVENANTS.

Provisions for advances.

7. It is hereby mutually agreed that the Lessor will advance to the Lessee from time to time upon the surveyor's report and valuation sums which in the aggregate shall not exceed £ , such advances to be computed on the basis of two-thirds of the nett first cost of materials and labour comprised in the work executed according to the following percentages (see p. 251) such sums to be repaid on

or before , together with interest at the rate of [5 or 6] per cent., per annum, to be computed from the times of the several advances.

Breaches of covenant.

8. Provided always that if the rents aforesaid or either of them or any part thereof respectively shall be in arrear and unpaid for the space of twenty-one days next after any of the days whereon the same ought to have been paid according to these presents, or if the Lessee shall fail or commit any breach in the performance or observance of any or either of the provisions or agreements herein contained and which ought to be kept and observed by him, then and in either of the said cases and without making any formal demand of the said rents or either of them the Lessor shall and lawfully may at any time after such breach non-observance or non-performance and without any legal process enter into and upon the said premises hereby agreed to be demised or any part thereof in the name of the whole and repossess and retain the same as of his former estate, anything herein contained to the contrary in anywise notwithstanding, but without prejudice to the recovery of any arrears of rents which may remain due and unsatisfied, or of the recovery of damages for breach of any of the agreements herein contained and on the part of the Lessee to be paid and performed.

Nature of tenancy.

9. And it is also agreed that these presents shall be construed as an Agreement only for letting and not as an actual demise, but that the Lessor shall have the same power of recovering rents in arrear under this Agreement by distress and sale as if these presents were an actual demise. And that in the meantime and until the land hereby agreed to be demised shall be actually demised the same shall be held by the Lessee as Tenant at will, such tenancy to be determinable by a written notice in any of the events hereinbefore mentioned in the proviso for re-entry hereinbefore contained.

Assignment.

10. And it is lastly agreed that the Lessee shall not at any time assign, mortgage, or underlet the benefit of this Agreement without the consent in writing of the Lessor.

As witness the hands of the parties

WITNESS

FORM OF LEASE, to Builders, of Houses erected by them upon land situated in the Metropolitan suburbs :—

Parties.

THIS INDENTURE made the day of 19 Between of in the County of Esquire, hereinafter called the Lessor (which expression shall include his heirs, executors, administrators and assigns where the context so admits) of the one part, And of in the County of hereinafter called the Lessee (which expression shall include his executors, administrators and assigns where the context so admits) of the other part. Witnesseth that in consideration of the expense already incurred and to be incurred by the Lessee in erecting and finishing the dwelling-house and other erections hereinafter demised, and of the rent and Lessee's Covenants hereinafter respectively reserved and contained, He the Lessor doth hereby demise unto the Lessee all that piece or parcel of land situate in the Parish of in the County of being part of the Estate, Together with all that messuage or dwelling-house thereon, or on some part thereof erected and built and known as and which said piece or parcel of ground and premises intended to be hereby demised are more particularly described in the Plan drawn in the margin of these Presents and are thereon coloured pink, Together with all the appurtenances whatsoever to the said piece or parcel of ground messuage and premises belonging or appertaining, but without including any rights of light or air over other ground or premises, and subject to all rights of light drainage and other easements belonging to any adjacent property. To hold the said premises hereby demised with their appurtenances (subject nevertheless as aforesaid) unto the Lessee for and during the term of 99 years to be computed from Yielding and Paying therefor during the said term the clear yearly rent or sum of £ free from all deductions whatsoever, except property tax, to be payable by equal quarterly payments on Lady Day, Midsummer Day, Michaelmas Day, and Christmas Day in every year,

Lessor's covenants.

Property demised.

Term.

the first quarterly payment whereof to be payable on
And the Lessee doth hereby covenant with the Lessor in manner following that is to say:—

Lessee's covenants.

1. That he the Lessee will yearly and every year during the continuance of the said term well and truly pay or cause to be paid the said rent hereby reserved upon the several days and in manner hereinbefore appointed for payment thereof, free from all deductions (except as aforesaid).

Payment of rent.

2. And also shall and will well and truly pay satisfy and discharge all tithe rent-charge paid by the Lessor in respect thereof, land tax (if any), Sewers rate, Main drainage rate, and all manner of taxes, rates, duties, assessments, impositions, and outgoings whatsoever, Parliamentary, Metropolitan, Parochial or otherwise which now are, or which shall at any time hereafter during the continuance of the said term hereby granted be assessed or imposed or payable in respect of the said premises or any part thereof, or upon the Landlord or Tenant in respect thereof (except as aforesaid). And also will execute all such works as are or may, under or in pursuance of any Act or Acts of Parliament already or hereafter to be passed, be directed or required by any District Council Local or Public Authority to be executed at any time during the said term upon or in respect of the premises hereby demised, whether by the Landlord or the Tenant thereof.

Outgoings.

3. And also shall and will by or before the
day of 19 , at his own cost and charges, complete and finish in a substantial and workmanlike manner and fit for habitation, the house and buildings erected or in course of being erected on the said demised premises, and all party and fence walls and the private drains appertaining to the same respectively, in accordance with the plans, elevations, sections, and specifications approved by the Lessor's Surveyor, and to the satisfaction of such Surveyor.

Completion of house.

4. And also that if in the erection of the dwelling-house or other permitted erection or building the Lessee has placed, or shall place windows in any of the walls thereof overlooking other land belonging to the Lessor, or his tenants, he shall be deemed to enjoy the access and use of

Rights of light.

light thereto with the consent and by the leave and licence of the Lessor and his tenants, and shall not by the enjoyment thereof acquire any absolute or indefeasible or other right thereto by which any such windows may or might become 'Ancient Lights,' as against the adjoining properties.

General repairs.

5. And also that he the Lessee shall and will at all times during the continuance of the said term, at his own proper costs and charges, repair, uphold, support, maintain, glaze, paint, cleanse, and keep in good and substantial repair and condition, the said messuage and premises hereby demised, together with all party walls and party structures fixtures and appurtenances thereunto belonging, and all other erections and buildings which may hereafter be erected on the said ground.

Methods of reparation.

6. And also will paint all the external wood, iron, stucco, and cement work of the said messuage and premises with two coats of good oil colours once in every three years during the said term, and all the internal wood and other work usually painted in the inside of the said messuage and premises with two coats of good oil colours once in every seven years, during the said term, and afterwards grain, marble and varnish the parts usually grained, marbled and varnished, and also wash distemper and whiten all ceilings and colour all walls, and repaper the rooms and staircase, regard being had to the character of the buildings and the general tastes of the occupants thereof as a class at the time of doing such works. And the said premises being so well and sufficiently repaired, upheld, supported, maintained, glazed, painted, cleansed, and kept shall and will at the end or sooner determination of the said term hereby granted peaceably and quietly surrender and yield up, together with all Landlord's fixtures thereto belonging, unto the Lessor or as he shall direct in good order and condition.

Road maintenance.

7. And also shall and will on demand from time to time and at all time during the continuance of the said term, and until the Road known as Road shall be taken over by the Town Council or other Local Authority, pay a fair and rateable share and proportion with the other Lessees and Tenants of the Lessor for the time being in the said Road of all expenses incurred by the Lessor in maintaining the said Road, and the

footpaths and drains belonging thereto in repair, such share to be from time to time determined by the surveyors for the time being of the Lessor, whose decision shall be final and binding upon all parties, and a proportionate share of whose fee in respect thereof shall be paid by the Lessee.

Rights of entry.

8. And also that it shall be lawful for the Lessor or his Agents, with or without Workmen or others, at all reasonable times to enter upon the demised premises to view the condition thereof, and of all such neglects decays and wants of reparation or cleansing as shall be then and there found to give or leave notice on the premises for the Lessee, his executors, administrators, or assigns to repair and amend the same, whereupon he or they shall forthwith repair and amend the same accordingly. And in case default shall be made in so repairing and amending the matters and things duly specified in such Notice for the space of three Calendar months, or in case any such matters or things shall be in the nature of a public or private nuisance or prejudicial to health, and the same be so stated in such Notice, if such default be made for the space of one week, then and in any or either of the cases aforesaid it shall be lawful for the Lessor or his agents servants and workmen or other persons or person duly authorised by him to enter into and upon the demised premises for the purpose of repairing and amending the matters and things specified as aforesaid, and to repair and amend the same accordingly and the costs and expenses of such repairs and amendments shall be recoverable by the Lessor against the Lessee, his executors, administrators, or assigns in any Court of competent jurisdiction.

Rights of adjoining lessees.

9. And will permit the Lessor, or his agents or workmen, and the tenants and occupiers of the adjoining messuages, at any time during the said term at reasonable hours in the daytime to enter upon the premises hereby demised for the purpose of executing repairs or alterations of or to such adjoining premises, making good to the Lessee all damages thereby caused.

Insurance.

10. And further that the Lessee shall at his own expense insure and keep insured during the said term the said messuage buildings and premises hereby appointed and demised and all future erections, if any, which shall be built

on the said premises against loss or damage by fire in the Fire Insurance Office, or in some one of the other Insurance Offices in London to be approved of by the Lessor in the joint names of the Lessor and the Lessee to the amount of not less than three-fourths of the value thereof, and shall and will from time to time at the request of the Lessor or his Agent produce the Policy or Policies of such Insurance and the receipt for the then current year's premium thereon. And in default that the Lessor shall be at liberty (if he shall think fit) to insure the said premises in such sum or sums as aforesaid, and shall be repaid by the Lessee all premiums, costs and expenses attending such Insurance on the next quarterly day for payment of rent. And will not carry on or permit upon the said premises anything which may render the policy void or voidable in respect of such insurance. And in case the house and buildings so insured or any part or parts thereof respectively shall be destroyed or damaged by fire, the amount received from the Insurance Office shall be forthwith expended in rebuilding and reinstating the same to the reasonable satisfaction of the Lessor, his Architect or Surveyor. And in case the amount so received shall be insufficient the deficiency shall be made good by the Lessee.

Additional buildings.

11. And also that the Lessee shall not nor will, without the licence or consent in writing of the Lessor first obtained, set up on any part of the said premises any erection other than those the plans, elevations, sections, and specifications whereof have already been approved as aforesaid by the Lessor or his Surveyor, nor pull down cut maim or injure any of the principal walls or timbers of the said messuage and premises, or make any alteration in the front or elevation of the said premises, nor use or permit or suffer the said premises to be used or occupied as a School or Asylum for Invalids, or for any other purpose than as a private dwelling-house only, nor permit Clothes to be dried in the Gardens of the said premises, nor use or permit or suffer the said Gardens to be used for any other purpose than as Gardens, nor allow any sale by Auction to take place on the said premises, or do or suffer to be done on the said premises or any part thereof any act matter or thing which may be or become an annoyance, nuisance or disturbance to the

neighbourhood, or to any Tenant of the Lessor. And further that if with the consent in writing of the Lessor previously obtained the Lessee shall at any time during the continuance of this demise set up on any part of the premises any erection other than those now erected or in course of being erected thereon, it shall not be lawful for the Lessee to use such further or other erections for any purpose other than that notified and expressed in such consent as aforesaid.

Removal of soil, timber, &c.

12. And also that the Lessee shall not nor will at any time during the continuance of the said term dig up, carry away or remove, or cause or permit to be dug up, carried away, or removed any earth loam sand or gravel from off the said premises (except only for the necessary purposes of building on the said premises, and except also as to the Gravel for use in the garden paths of the said premises) nor cut any timber or other trees, nor shall nor will make or burn, or permit to be made or burnt any clay or other earth bricks or tiles upon any part of the said premises without the consent in writing of the Lessor for every such purpose first obtained.

Notice of assignment.

13. And also shall and will within two Calendar months next after any Assignment of these Presents and the premises herein comprised give Notice in writing of such Assignment and produce the instrument of assignment to the Lessor's Solicitors for the time being for the purpose of being registered in the Lessor's books, and pay the Lessor or his Agent a fee of 10*s.* 6*d.* in respect of each such registration.

Mutual covenants.

14. Provided always, and these Presents are upon this express condition, that if the said yearly rent of £ hereinbefore reserved or any part thereof shall be unpaid for 21 days after any or either of the days hereinbefore appointed for payment thereof, whether the same shall have been demanded or not, or if the Lessee shall not observe and perform all and every of the covenants and agreements hereinbefore contained, then and in any or either of such cases it shall be lawful for the Lessor into and upon the said premises or any part thereof in the name of the whole to re-enter (and without making any formal demand of the said rent) and the same to repossess and enjoy as in his

former estate, anything herein contained to the contrary thereof notwithstanding. And the Lessor doth hereby covenant with the Lessee, that the Lessee duly paying the yearly rent hereby reserved and duly observing and performing the several covenants stipulations and agreements hereinbefore contained, and by him to be paid observed and performed, shall and may lawfully peaceably and quietly hold and enjoy the said premises with their appurtenances for the term hereby granted, without any lawful interruption whatsoever of or by the Lessor, or of or by any person or persons lawfully or equitably claiming or to claim from under or in trust for him. In witness whereof the said Parties to these Presents have hereunto set their hands and seals the day and year first above written.

FORM OF RESTRICTIONS applicable to a property intended to be developed for good class family or villa residences.

STIPULATIONS

subject to which the blocks are to be let or sold.

Ground rent.

1. The land will be let subject to a ground rent which shall be payable quarterly by the Lessee free from all deductions whatsoever, except Landlord's Property Tax.

User.

2. No portion of the land, nor any building thereon shall at any time be used for the purposes of any noxious trade, and the Lessee or Purchaser shall not use any part of the land leased or purchased by him as a road or highway, or right of way of any description.

Excavations, &c.

3. The Lessee or Purchaser shall not burn any clay or other earth, nor make bricks or tiles on any part of the said premises, nor dig any gravel or sand (except what may be required for the paths of the gardens in the said premises, or for use in the building of the said dwelling-houses), nor cut any timber or other trees, and will not excavate the ground except so far as may be necessary for the foundations of the said intended dwelling-houses, fences, drains and other works.

Character and value of buildings.

4. The Lessee or Purchaser shall and will within the respective periods, and in the manner hereinafter mentioned, at his own expense build and completely finish with good

materials and workmanship to the satisfaction and approval of the Lessor's Surveyors, from plans, elevations and sections to be approved in writing by the Lessor's Surveyors, upon the land and upon such sites and lines of frontage as the Lessor shall approve, and also in accordance with the regulations of the Corporation of or other duly constituted authority, the messuages or dwelling-houses as stated in the following schedule, and all suitable and necessary drains, offices, gates, fences, fence and other walls and fittings, supply of water, water-closets, and appurtenances, and shall lay out the ground round the said dwelling-houses respectively as gardens. No more than six adjacent houses shall be constructed from one design, and in similar materials.

SCHEDULE ABOVE REFERRED TO.

Description.	Main road frontage.	Mean depth.	Maximum number of houses on each block.	Minimum value of each house.
Block A ..	About 620 feet	About 200 feet	15	£ s. d. 1000 0 0

In all cases the values are to be exclusive of any other building permitted by these stipulations, and such values are to be taken as the nett first cost of materials and labour of construction only, to be estimated by the Owner's Surveyors at the lowest current prices.

Every person shall upon so submitting the plan, elevations and sections of every new building, also deposit with such Surveyors a duplicate set of copies of such drawings.

Building line.

5. No building nor any portion thereof, except a boundary wall or fence, portico, porch, verandah, balcony, eaves, sill, steps or architectural ornament shall be erected anywhere above the ground level beyond the building line as shown on the Estate Plan.

Boundary fences.

6. Every person erecting a building shall construct in front of the land intended to be occupied therewith a wall or fence not exceeding 5 feet in height, and of design to

be approved by the Owner's Surveyors at the time and in the manner provided for buildings by Clause 4, and he shall also enclose the said land on all other open sides with a wall or oak pale fence at least 5 ft. 6 in., and not exceeding 8 feet in height. If any question shall arise between different Builders or other persons having acquired any interest in the Estate, or between the Owner and any such Builder or other interested person as to the boundaries between any Blocks or Plots, the same shall be settled by the Owner's Surveyors, and whose decision shall be final.

User.

7. The Lessee or Purchaser shall not deposit any building materials upon any of the roads, nor use or permit to be used any dwelling-house to be erected on any part of the said premises for a School or Asylum for Invalids, or for any trade or business whatsoever, or for any other purpose than as a private dwelling-house only, nor permit clothes to be dried in the gardens of the said premises, or do or permit any act, matter or thing to be done in or upon the said premises which may be or grow to the injury or annoyance of the Lessor, or his Tenants of any adjacent or adjoining premises, or of the neighbourhood.

Roads.

8. The proposed roads and sewers will in each case be formed at the expense of the Owner, but the Lessee or Purchaser shall from time to time, and at all times when required so to do, pay to the Owner a fair share of the cost of maintaining and repairing the said roads and the footpaths, sewers and drains belonging thereto, until the said roads shall be taken over by the Local Authorities, such share to be determined in all cases by the Surveyor for the time being of the Owner, whose decision shall be final and binding on all parties, and whose charges in respect thereof shall also be paid by the Lessee or Purchaser.

Insurance.

9. The Lessee shall and will when and so soon as the said dwelling-houses or any of them shall be roofed in, insure the same in the   Fire Insurance Office, or in some one of the other insurance offices in London to be approved of in writing by the Lessor, in the joint names of the Lessor and of the Lessee, to the amount of three-fourths at least of the full value thereof, and thenceforth keep the same so insured.

Granting of leases.

10. The Lessor shall, as soon as the Lessee has erected

and covered in any of the said messuages or dwelling-houses and completed the drains and fence walls or fences thereof to the satisfaction of the Surveyors to the Estate (provided that the Lessee has paid the rent then due, and observed and performed this agreement in all respects up to that time), grant to the Lessee at a rental to be apportioned by the Lessor's Surveyors, and the Lessee shall, without requiring the production of the title of the Lessor, accept and execute a counterpart of a separate Lease of each of the said messuages or dwelling-houses so erected and covered in with the appurtenances, each such Lease to be in accordance with the form of Lease in use on the estate of the Lessor, but with such variations adapted to the state of the premises and otherwise as circumstances or the requirements of the Local Authorities may render necessary, or as the Solicitors of the Lessor shall advise, and such Lease shall contain a covenant on the part of the Lessee not to erect or build any other erection or building on the said premises, other than those then standing or built thereon, without the consent of the Lessor, or to raise the party walls above their then present height, or erect any screen or hoarding on any part of the said premises.

Payments by lessee or purchaser.

11. The Lessee or Purchaser shall pay all District and Corporation Surveyors' and other lawful fees and charges incident to buildings and works at aforesaid, whether payable under any Act of Parliament for the time being in force or otherwise.

He shall also pay to the Solicitors of the Lessor the costs of preparing and executing every such Lease with a Counterpart thereof, together with the sum of £3 3*s.* for the preparation and execution of the Building Agreement or Contract for sale and a Counterpart thereof; to the Owner's Surveyors the sum of £2 2*s.* on the signing of the Building Agreement or Contract, for drawing plans therefor, and for staking out the land; a fee of £2 2*s.* for examining the plans of a proposed building, but in the event of more than one building being erected from the same drawings and specification the fee shall be half a guinea for each building subsequently erected from such drawings and specification, but no more than six adjacent houses shall be constructed from one design and in similar materials; and the sum of £2 2*s.* on the granting of each Lease for preparing and drawing the Plans on the Lease and Counterpart, and certifying that such Lease may be granted.

Building agreement.

12. All lettings to be subject to the execution of the formal Building Agreement in use on the Estate, and the Lessee shall, after the execution of such agreement, commence the erection of the several houses, and shall complete the same within such times as shall be agreed with the Owner's Surveyors.

Variation of scheme.

13. The scheme of roads, building lines, and other matters as shown on the Estate Plan, and the building and other restrictions imposed upon Lessees and Purchasers shall not be binding on the Owner, and he shall be entitled to vary or alter the same as regards any block or plots, but no deviation by the Owner from the Building Scheme shall be made which may prejudice or injure any Builders or other persons who have previously acquired an interest in the Estate.

FORM OF RESTRICTIONS applicable to the sale or letting of a portion of an estate suitable for workmen's dwellings and shops.

THE WONFORD BUILDING ESTATE

(*Eastern Section*).

RESTRICTIONS.

Building line.

1. No building or any portion thereof except a boundary wall or fence, portico, porch, verandah, bay window, or architectural ornament, shall be erected anywhere above the ground level in front of the building line as shown on the Estate Plan.

Boundary fences.

2. Every person erecting a building, other than a shop, shall construct a good and sufficient wall or fence next the road not exceeding 4 ft. 6 in. high and of design to be approved by the Owners' Surveyors, and he shall also enclose the said land on all other open sides with a wall or substantial boundary fence at least 4 ft. 6 in. high, and not exceeding 8 feet in height.

3. No plot or portion of a plot purchased or leased shall be used for a road, or highway, of any description, or for a right of way without the written consent of the Owners. No Purchaser or Lessee shall use any plot or plots fronting the Standen Road, with the exception hereinafter named, for any other purpose than the erection of private dwelling-houses (which may have medical and surgical consulting rooms, studios and lecture rooms attached) or the construction of any of their appurtenances. The remaining sites may be used for shops, in which, however, with the exceptions hereinafter named, there shall not be carried on the trade of a Publican, Hotel, or Beer-House Keeper, Slaughter House, Asylum for Lunatics or Idiots, nor any noxious or noisy trade or occupation, or any Factory involving the use of machinery, or which may cause a nuisance, damage, grievance, annoyance or disturbance to the owners, their heirs or assigns, or their tenants, or the owners or tenants of adjoining properties, or which may tend to depreciate or lessen the value of the Estate of the Owners or any part thereof as a Residential property. No hut, shed, caravan, house on wheels, or other chattel adapted or intended for use as a dwelling, or any shows, booths, swings, or roundabouts shall be erected, made, placed, or used, or be allowed to remain on any plot, and the Owners or their Agents, or the Purchaser or Lessee of any of the plots to which these stipulations relate, may remove and dispose of such erection or other thing, and for that purpose may break fences, and forcibly enter any land upon which a breach of this stipulation shall occur, and shall not be responsible for the safe keeping of anything so removed or for the loss thereof or any damage thereto. The Owners reserve the right to sell or let a corner plot as a site for the erection of a suitable hotel or public house, and to sell or let any portion of the property for the site of a Church or other public building. User.

4. The Owners' Surveyors shall stake out the boundaries of every plot or block of land to be leased or purchased, and shall be paid a fee of two guineas for each plot or block of land so staked out. If any question shall arise between different Builders or other persons having acquired Boundaries.

any interest in the estate, or between the Owners and any such Builder or other interested person as to the boundaries between any plots or blocks of land, the same shall be settled by the Owners' Surveyors, whose decision shall be final.

Roads.

5. The roadways and footpaths have been formed in accordance with Plans which received the approval of the Urban Council of the District, but all future liabilities in respect of the completion of such roadways and footpaths, or for their maintenance or repair will be vested in the Purchasers or Lessees to the extent of the various plots so purchased or leased, and such Purchasers or Lessees shall indemnify the Owners against such liabilities.

Plans and specifications.

6. No building of any kind shall be erected on the Estate until the site of such building and the Plans of each floor, with sections and elevations and a general Specification of the materials which it is proposed to use in its construction, shall have been previously submitted to, and approved in writing by, the Owners' Surveyors. Every person shall upon so submitting the plans, section, elevations and specification of every new building, also deposit with such Surveyors a duplicate set of copies of such drawings, and pay to the said Surveyors a fee of one guinea for examining the same, but in the event of more than one building being erected from the same drawings and specification, the fee shall be half a guinea for each building subsequently erected from any such drawings and specification.

Value of buildings.

7. The Purchasers or Lessees of the several plots will be required to observe the following building values :— The sum of £250 at the least shall be expended in the construction of each house to be erected on sites fronting the Standen Road, and the sum of £150 at the least shall be expended in the construction of each house to be erected on the remaining sites. In all cases the above values are to be taken as the nett first cost of materials and labour of construction only, estimated at the lowest current prices.

Certificates of compliance.

8. In the case of leaseholds, no lease of any portion of the estate will be granted until a certificate has been

issued by the Owners' Surveyors certifying that these stipulations have been complied with, and the said Surveyors shall be paid a fee of one guinea for every such Certificate.

Variation of scheme. 9. The scheme of roads, building lines, and other matters as shown on the Estate Plan, and the building and other restrictions imposed upon Builders or other interested persons shall not be binding on the Owners, and the Owners shall be entitled to vary or alter the same so far as they may affect any portions of the property not let or sold.

Clause for insertion in Leases or Agreements of Land possessing an element of prospective value for building purposes.

And also except and reserved to the said $\overset{\text{Lessor}}{\text{Landlord}}$ the right at any time during the continuance of the said tenancy, upon giving twenty-eight days' previous notice in writing to the said $\overset{\text{Lessee}}{\text{Tenant,}}$ to enter and take any part of the said [demised] premises (except the farmhouse and buildings comprised in No.) that he may require for the construction of any new road, or for building, exchange, or any other purpose connected with building development, the said $\overset{\text{Lessor}}{\text{Landlord}}$ agreeing in any such event to make an abatement in the rent in respect of such part of the premises so taken at the rate of £ per acre, per annum (*equal to double the average rent-paid*), and also to pay to the said $\overset{\text{Lessee}}{\text{Tenant}}$ reasonable compensation for all matters of agricultural tenant-right, including any unexhausted tenant's improvements comprised in the Agricultural Holdings Act, 1908, on the land so taken, such compensation to be determined, in case the parties differ, by two valuers, one to be appointed by the $\overset{\text{Lessor}}{\text{Landlord}}$ and the other by the $\overset{\text{Lessee}}{\text{Tenant,}}$ or by an umpire to be appointed by such valuers.

APPENDIX C

TABLE I.—THE AMOUNT OF A CAPITAL SUM OF £1 ACCUMULATING AT COMPOUND INTEREST FOR TERMS OF YEARS. *Example.*—A sum of £10 bearing interest at 4 per cent. will amount to £21·91 at the end of 20 years.

Years	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.	7 per cent.	Years
1	1·025	1·030	1·035	1·040	1·045	1·050	1·060	1·070	1
2	1·050	1·060	1·071	1·081	1·092	1·102	1·123	1·144	2
3	1·076	1·092	1·108	1·124	1·141	1·157	1·191	1·225	3
4	1·103	1·125	1·147	1·169	1·192	1·215	1·262	1·310	4
5	1·131	1·159	1·187	1·216	1·246	1·276	1·338	1·402	5
6	1·159	1·194	1·229	1·265	1·302	1·340	1·418	1·500	6
7	1·188	1·229	1·272	1·315	1·360	1·407	1·503	1·605	7
8	1·218	1·266	1·316	1·368	1·422	1·477	1·593	1·718	8
9	1·248	1·304	1·362	1·423	1·486	1·551	1·689	1·838	9
10	1·280	1·343	1·410	1·480	1·553	1·628	1·790	1·967	10
11	1·312	1·384	1·460	1·539	1·622	1·710	1·898	2·104	11
12	1·344	1·425	1·511	1·601	1·695	1·795	2·012	2·252	12
13	1·378	1·468	1·564	1·665	1·772	1·885	2·132	2·409	13
14	1·413	1·512	1·618	1·731	1·852	1·979	2·260	2·578	14
15	1·448	1·558	1·675	1·800	1·935	2·078	2·396	2·759	15
16	1·484	1·604	1·734	1·873	2·022	2·182	2·540	2·952	16
17	1·521	1·652	1·794	1·947	2·113	2·292	2·692	3·158	17
18	1·559	1·702	1·857	2·025	2·208	2·406	2·854	3·379	18
19	1·598	1·753	1·922	2·106	2·307	2·527	3·025	3·616	19
20	1·638	1·806	1·989	2·191	2·411	2·653	3·207	3·869	20
21	1·679	1·860	2·059	2·278	2·520	2·786	3·399	4·140	21
22	1·721	1·916	2·131	2·369	2·633	2·925	3·603	4·430	22
23	1·764	1·973	2·206	2·464	2·752	3·071	3·819	4·740	23
24	1·808	2·032	2·283	2·563	2·876	3·225	4·048	5·072	24
25	1·853	2·093	2·363	2·665	3·005	3·386	4·291	5·427	25
26	1·900	2·156	2·446	2·772	3·140	3·555	4·549	5·807	26
27	1·947	2·221	2·531	2·883	3·282	3·733	4·822	6·213	27
28	1·996	2·287	2·620	2·998	3·429	3·920	5·111	6·648	28
29	2·046	2·356	2·711	3·118	3·584	4·116	5·418	7·114	29
30	2·097	2·427	2·806	3·243	3·745	4·321	5·743	7·612	30
31	2·150	2·500	2·905	3·373	3·913	4·538	6·088	8·145	31
32	2·203	2·575	3·006	3·508	4·090	4·764	6·453	8·715	32
33	2·258	2·652	3·111	3·648	4·274	5·003	6·840	9·325	33
34	2·315	2·731	3·220	3·794	4·466	5·253	7·251	9·978	34
35	2·373	2·813	3·333	3·946	4·667	5·516	7·686	10·676	35
36	2·432	2·898	3·450	4·103	4·877	5·791	8·147	11·423	36
37	2·493	2·985	3·570	4·268	5·096	6·081	8·636	12·223	37
38	2·555	3·074	3·696	4·438	5·326	6·385	9·154	13·079	38
39	2·619	3·167	3·825	4·616	5·565	6·704	9·703	13·994	39
40	2·685	3·262	3·959	4·801	5·816	7·040	10·285	14·974	40
41	2·752	3·359	4·097	4·993	6·078	7·392	10·902	16·022	41
42	2·821	3·460	4·241	5·192	6·351	7·761	11·557	17·144	42
43	2·891	3·564	4·389	5·400	6·637	8·149	12·250	18·344	43
44	2·963	3·671	4·543	5·616	6·936	8·557	12·985	19·628	44
45	3·037	3·781	4·702	5·841	7·248	8·985	13·764	21·002	45
46	3·113	3·895	4·866	6·074	7·574	9·434	14·590	22·472	46
47	3·191	4·011	5·037	6·317	7·915	9·906	15·465	24·045	47
48	3·271	4·132	5·213	6·570	8·271	10·401	16·393	25·728	48
49	3·353	4·256	5·396	6·833	8·643	10·921	17·377	27·529	49
50	3·437	4·383	5·584	7·106	9·032	11·467	18·420	29·457	50

TABLE I—(*continued*).

Years	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.	7 per cent.	Years
51	3·523	4·515	5·780	7·391	9·439	12·040	19·525	31·519	51
52	3·611	4·650	5·982	7·686	9·863	12·642	20·696	33·725	52
53	3·701	4·790	6·192	7·994	10·307	13·274	21·938	36·586	53
54	3·793	4·934	6·408	8·313	10·771	13·938	23·255	38·612	54
55	3·888	5·082	6·633	8·646	11·256	14·635	24·650	41·315	55
56	3·986	5·234	6·865	8·992	11·762	15·367	26·129	44·207	56
57	4·085	5·391	7·105	9·351	12·292	16·135	27·697	47·301	57
58	4·187	5·553	7·354	9·726	12·845	16·942	29·358	50·612	58
59	4·292	5·720	7·611	10·115	13·423	17·789	31·120	54·155	59
60	4·399	5·891	7·878	10·519	14·027	18·679	32·987	57·946	60
61	4·509	6·068	8·153	10·940	14·658	19·613	34·967	62·002	61
62	4·622	6·250	8·439	11·378	15·318	20·593	37·065	66·342	62
63	4·738	6·437	8·734	11·833	16·007	21·623	39·288	70·986	63
64	4·856	6·631	9·040	12·306	16·727	22·704	41·646	75·955	64
65	4·978	6·830	9·356	12·798	17·480	23·839	44·145	81·272	65
66	5·102	7·034	9·684	13·310	18·267	25·031	46·793	86·961	66
67	5·230	7·246	10·023	13·843	19·089	26·283	49·601	93·049	67
68	5·360	7·463	10·373	14·396	19·948	27·597	52·577	99·562	68
69	5·494	7·687	10·737	14·972	20·846	28·977	55·732	106·532	69
70	5·632	7·917	11·112	15·571	21·784	30·426	59·075	113·989	70
71	5·772	8·155	11·501	16·194	22·764	31·947	62·620	121·968	71
72	5·917	8·400	11·904	16·842	23·788	33·545	66·377	130·506	72
73	6·065	8·652	12·321	17·516	24·859	35·222	70·360	139·641	73
74	6·216	8·911	12·752	18·216	25·978	36·983	74·582	149·416	74
75	6·372	9·178	13·198	18·945	27·147	38·832	79·056	159·876	75
76	6·531	9·454	13·660	19·703	28·368	40·774	83·800	171·067	76
77	6·694	9·737	14·138	20·491	29·645	42·813	88·828	183·042	77
78	6·862	10·030	14·633	21·310	30·979	44·953	94·158	195·854	78
79	7·033	10·331	15·145	22·163	32·373	47·201	99·807	209·564	79
80	7·209	10·640	15·675	23·049	33·830	49·561	105·796	224·234	80
81	7·389	10·960	16·224	23·971	35·352	52·039	112·143	239·930	81
82	7·574	11·288	16·792	24·930	36·943	54·641	118·872	256·725	82
83	7·763	11·627	17·380	25·927	38·605	57·373	126·004	274·696	83
84	7·958	11·976	17·988	26·965	40·343	60·242	133·565	293·925	84
85	8·157	12·335	18·617	28·043	42·158	63·254	141·578	314·500	85
86	8·360	12·705	19·269	29·165	44·055	66·417	150·073	336·515	86
87	8·569	13·087	19·943	30·332	46·038	69·737	159·078	360·071	87
88	8·784	13·479	20·642	31·545	48·109	73·224	168·622	385·276	88
89	9·003	13·883	21·364	32·807	50·274	76·886	178·740	412·245	89
90	9·228	14·300	22·112	34·119	52·537	80·730	189·464	441·102	90
91	9·459	14·729	22·886	35·484	54·901	84·766	200·832	471·980	91
92	9·696	15·171	23·687	36·903	57·371	89·005	212·882	505·018	92
93	9·938	15·626	24·516	38·379	59·953	93·455	225·655	540·370	93
94	10·186	16·095	25·374	39·914	62·651	98·128	239·194	578·196	94
95	10·441	16·578	26·262	41·511	65·472	103·034	253·546	618·669	95
96	10·702	17·075	27·181	43·171	68·417	108·186	268·759	661·976	96
97	10·970	17·587	28·132	44·898	71·495	113·595	284·884	708·314	97
98	11·244	18·115	29·117	46·694	74·713	119·275	301·977	757·897	98
99	11·525	18·658	30·136	48·562	78·075	125·239	320·096	810·949	99
100	11·813	19·218	31·191	50·504	81·588	131·501	339·302	867·716	100

TABLE II.—THE AMOUNT OF ONE POUND, PER ANNUM, ACCUMULATING AT COMPOUND INTEREST FOR TERMS OF YEARS.

Example.—A yearly sum of £100, invested at 4 per cent. compound interest, will amount to £2,977·8 at the end of 20 years.

Years	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
1	1·000	1·000	1·000	1·000	1·000	1·000	1·000
2	2·025	2·030	2·035	2·040	2·045	2·050	2·060
3	3·076	3·091	3·106	3·122	3·137	3·153	3·184
4	4·153	4·184	4·215	4·246	4·278	4·310	4·375
5	5·256	5·309	5·362	5·416	5·471	5·526	5·638
6	6·388	6·468	6·550	6·633	6·717	6·802	6·976
7	7·547	7·662	7·779	7·898	8·019	8·142	8·394
8	8·736	8·892	9·052	9·214	9·380	9·549	9·897
9	9·955	10·159	10·368	10·583	10·802	11·027	11·491
10	11·203	11·464	11·731	12·006	12·288	12·578	13·181
11	12·483	12·808	13·142	13·486	13·841	14·207	14·972
12	13·796	14·192	14·602	15·026	15·464	15·917	16·870
13	15·140	15·618	16·113	16·627	17·160	17·713	18·882
14	16·519	17·086	17·677	18·292	18·932	19·599	21·015
15	17·932	18·599	19·296	20·024	20·784	21·579	23·276
16	19·380	20·157	20·971	21·825	22·719	23·657	25·673
17	20·865	21·762	22·705	23·698	24·742	25·840	28·213
18	22·386	23·414	24·500	25·645	26·855	28·132	30·906
19	23·946	25·117	26·357	27·671	29·064	30·539	33·760
20	25·545	26·870	28·280	29·778	31·371	33·066	36·786
21	27·183	28·676	30·269	31·969	33·783	35·719	39·993
22	28·863	30·537	32·329	34·248	36·303	38·505	43·392
23	30·584	32·453	34·460	36·618	38·937	41·430	46·996
24	32·349	34·426	36·667	39·083	41·689	44·502	50·816
25	34·158	36·459	38·950	41·646	44·565	47·727	54·865
26	36·012	38·553	41·313	44·312	47·571	51·113	59·156
27	37·912	40·710	43·759	47·084	50·711	54·669	63·706
28	39·860	42·931	46·291	49·968	53·993	58·403	68·528
29	41·856	45·219	48·911	52·966	57·423	62·323	73·640
30	43·903	47·575	51·623	56·085	61·007	66·439	79·058
31	46·000	50·003	54·429	59·328	64·752	70·761	84·802
32	48·150	52·503	57·335	62·701	68·666	75·299	90·890
33	50·354	55·078	60·341	66·210	72·756	80·064	97·343
34	52·613	57·730	63·453	69·858	77·030	85·067	104·184
35	54·928	60·462	66·674	73·652	81·497	90·320	111·435
36	57·301	63·276	70·008	77·598	86·164	95·836	119·121
37	59·734	66·174	73·458	81·702	91·041	101·628	127·268
38	62·227	69·159	77·029	85·970	96·138	107·710	135·904
39	64·783	72·234	80·725	90·409	101·464	114·095	145·058
40	67·403	75·401	84·550	95·026	107·030	120·800	154·762
41	70·088	78·663	88·510	99·827	112·847	127·840	165·048
42	72·840	82·023	92·607	104·820	118·925	135·232	175·951
43	75·661	85·484	96·849	110·012	125·276	142·993	187·508
44	78·552	89·048	101·238	115·413	131·914	151·143	199·758
45	81·516	92·720	105·782	121·029	138·850	159·700	212·744
46	84·554	96·501	110·484	126·871	146·098	168·685	226·508
47	87·668	100·397	115·351	132·945	153·673	178·119	241·099
48	90·860	104·408	120·388	139·263	161·588	188·025	256·565
49	94·131	108·541	125·602	145·834	169·859	198·427	272·958
50	97·484	112·797	130·998	152·667	178·503	209·348	290·336

TABLE III.—THE PRESENT VALUE OF A CAPITAL SUM OF £1 PAYABLE AT THE END OF ANY GIVEN NUMBER OF YEARS NOT EXCEEDING 100.

Example.—The present value of £100 to be paid 20 years hence at 4 per cent. is given as £45·64.

Years	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.	7 per cent.	Years
1	·9756	·9709	·9662	·9615	·9569	·9524	·9434	·9346	1
2	·9518	·9426	·9335	·9246	·9157	·9070	·8900	·8734	2
3	·9286	·9151	·9019	·8890	·8763	·8638	·8396	·8163	3
4	·9060	·8885	·8714	·8548	·8386	·8227	·7921	·7629	4
5	·8839	·8626	·8420	·8219	·8025	·7835	·7473	·7130	5
6	·8623	·8375	·8135	·7903	·7679	·7462	·7050	·6663	6
7	·8413	·8131	·7860	·7599	·7348	·7107	·6651	·6227	7
8	·8207	·7894	·7594	·7307	·7032	·6768	·6274	·5820	8
9	·8007	·7664	·7337	·7026	·6729	·6446	·5919	·5439	9
10	·7812	·7441	·7089	·6756	·6439	·6139	·5584	·5083	10
11	·7621	·7224	·6849	·6496	·6162	·5847	·5268	·4751	11
12	·7436	·7014	·6618	·6246	·5897	·5568	·4970	·4440	12
13	·7254	·6810	·6394	·6006	·5643	·5303	·4688	·4150	13
14	·7077	·6611	·6178	·5775	·5400	·5051	·4423	·3878	14
15	·6905	·6419	·5969	·5553	·5167	·4810	·4173	·3624	15
16	·6736	·6232	·5767	·5339	·4945	·4581	·3936	·3387	16
17	·6572	·6050	·5572	·5134	·4732	·4363	·3714	·3166	17
18	·6412	·5874	·5384	·4936	·4528	·4155	·3503	·2959	18
19	·6255	·5703	·5202	·4746	·4333	·3957	·3305	·2765	19
20	·6103	·5537	·5026	·4564	·4146	·3769	·3118	·2584	20
21	·5954	·5375	·4856	·4388	·3968	·3589	·2942	·2415	21
22	·5809	·5219	·4692	·4220	·3797	·3418	·2775	·2257	22
23	·5667	·5067	·4533	·4057	·3634	·3256	·2618	·2109	23
24	·5529	·4919	·4380	·3901	·3477	·3101	·2470	·1971	24
25	·5394	·4776	·4232	·3751	·3327	·2953	·2330	·1842	25
26	·5262	·4637	·4088	·3607	·3184	·2812	·2198	·1722	26
27	·5134	·4502	·3950	·3468	·3047	·2678	·2074	·1609	27
28	·5009	·4371	·3817	·3335	·2916	·2551	·1956	·1504	28
29	·4887	·4243	·3688	·3207	·2790	·2429	·1846	·1406	29
30	·4767	·4120	·3563	·3083	·2670	·2314	·1741	·1314	30
31	·4651	·4000	·3442	·2965	·2555	·2204	·1643	·1228	31
32	·4538	·3883	·3326	·2851	·2445	·2099	·1550	·1147	32
33	·4427	·3770	·3213	·2741	·2340	·1999	·1462	·1072	33
34	·4319	·3660	·3105	·2636	·2239	·1904	·1379	·1002	34
35	·4214	·3554	·3000	·2534	·2143	·1813	·1301	·0937	35
36	·4111	·3450	·2898	·2437	·2050	·1727	·1227	·0875	36
37	·4011	·3350	·2800	·2343	·1962	·1644	·1158	·0818	37
38	·3913	·3252	·2706	·2253	·1878	·1566	·1092	·0765	38
39	·3817	·3158	·2614	·2166	·1797	·1491	·1031	·0715	39
40	·3724	·3066	·2526	·2083	·1719	·1420	·0972	·0668	40
41	·3634	·2976	·2440	·2003	·1645	·1353	·0917	·0624	41
42	·3545	·2890	·2358	·1926	·1574	·1288	·0865	·0583	42
43	·3458	·2805	·2278	·1852	·1507	·1257	·0816	·0545	43
44	·3374	·2724	·2201	·1780	·1442	·1169	·0770	·0509	44
45	·3292	·2644	·2127	·1712	·1380	·1113	·0727	·0476	45

TABLE III—(*continued*).

Years	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.	7 per cent.	Years
46	·3211	·2567	·2055	·1646	·1320	·1060	·0685	·0445	46
47	·3133	·2493	·1985	·1583	·1263	·1009	·0647	·0416	47
48	·3057	·2420	·1918	·1522	·1209	·0961	·0610	·0389	48
49	·2982	·2350	·1853	·1463	·1157	·0916	·0575	·0363	49
50	·2909	·2281	·1791	·1407	·1107	·0872	·0543	·0339	50
51	·2838	·2215	·1730	·1353	·1059	·0831	·0512	·0317	51
52	·2769	·2150	·1671	·1301	·1014	·0791	·0483	·0297	52
53	·2702	·2088	·1615	·1251	·0970	·0753	·0456	·0277	53
54	·2636	·2027	·1560	·1203	·0928	·0717	·0430	·0259	54
55	·2572	·1968	·1508	·1157	·0888	·0683	·0406	·0242	55
56	·2509	·1910	·1457	·1112	·0850	·0651	·0383	·0226	56
57	·2448	·1855	·1407	·1069	·0814	·0620	·0361	·0211	57
58	·2388	·1801	·1360	·1028	·0779	·0590	·0341	·0198	58
59	·2330	·1748	·1314	·0989	·0745	·0562	·0321	·0185	59
60	·2273	·1697	·1269	·0951	·0713	·0535	·0303	·0173	60
61	·2217	·1648	·1226	·0914	·0682	·0510	·0286	·0161	61
62	·2163	·1600	·1185	·0879	·0653	·0486	·0270	·0151	62
63	·2111	·1553	·1145	·0845	·0625	·0462	·0255	·0141	63
64	·2059	·1508	·1106	·0813	·0598	·0440	·0240	·0132	64
65	·2009	·1464	·1069	·0781	·0572	·0419	·0227	·0123	65
66	·1960	·1421	·1033	·0751	·0547	·0399	·0214	·0115	66
67	·1912	·1380	·0998	·0722	·0524	·0380	·0202	·0107	67
68	·1865	·1340	·0964	·0695	·0501	·0362	·0190	·0100	68
69	·1820	·1301	·0931	·0668	·0480	·0345	·0179	·0094	69
70	·1776	·1263	·0900	·0642	·0459	·0329	·0169	·0088	70
71	·1732	·1226	·0869	·0617	·0439	·0313	·0160	·0082	71
72	·1690	·1190	·0840	·0594	·0420	·0298	·0151	·0077	72
73	·1649	·1156	·0812	·0571	·0402	·0284	·0142	·0072	73
74	·1609	·1122	·0784	·0549	·0385	·0270	·0134	·0067	74
75	·1569	·1089	·0758	·0528	·0368	·0258	·0126	·0063	75
76	·1531	·1058	·0732	·0508	·0353	·0245	·0119	·0058	76
77	·1494	·1027	·0707	·0488	·0337	·0234	·0113	·0055	77
78	·1457	·0997	·0683	·0469	·0323	·0222	·0106	·0051	78
79	·1422	·0968	·0660	·0451	·0309	·0212	·0100	·0048	79
80	·1387	·0940	·0638	·0434	·0296	·0202	·0095	·0045	80
81	·1353	·0912	·0616	·0417	·0283	·0192	·0089	·0042	81
82	·1320	·0886	·0596	·0401	·0271	·0183	·0084	·0039	82
83	·1288	·0860	·0575	·0386	·0259	·0174	·0679	·0036	83
84	·1257	·0835	·0556	·0371	·0248	·0166	·0075	·0034	84
85	·1226	·0811	·0537	·0357	·0237	·0158	·0071	·0032	85
86	·1196	·0787	·0519	·0343	·0227	·0151	·0067	·0030	86
87	·1167	·0764	·0510	·0330	·0217	·0143	·0063	·0028	87
88	·1138	·0742	·0484	·0317	·0208	·0137	·0059	·0026	88
89	·1111	·0720	·0468	·0305	·0199	·0130	·0056	·0024	89
90	·1084	·0699	·0452	·0293	·0190	·0124	·0053	·0023	90
91	·1057	·0679	·0437	·0282	·0182	·0118	·0050	·0021	91
92	·1031	·0659	·0422	·0271	·0174	·0112	·0047	·0020	92
93	·1006	·0640	·0408	·0261	·0167	·0107	·0044	·0019	93
94	·0982	·0621	·0394	·0251	·0160	·0102	·0042	·0017	94
95	·0958	·0603	·0381	·0241	·0153	·0097	·0039	·0016	95
96	·0934	·0586	·0368	·0232	·0146	·0092	·0037	·0015	96
97	·0912	·0569	·0355	·0223	·0140	·0088	·0035	·0014	97
98	·0889	·0552	·0343	·0214	·0134	·0084	·0033	·0013	98
99	·0868	·0536	·0332	·0206	·0128	·0080	·0031	·0012	90
100	·0846	·0520	·0321	·0198	·0123	·0076	·0029	·0012	100

Table IV.—The Purchase Value of a Ground Rent, Annuity, or other Yearly Payment of One Pound for a given Number of Years, to yield Certain Rates of Interest together with Purchase Price.—(Abridged from "Inwood's Tables."[1])

Example.—The present value of a ground rent of £10 per annum held for 20 years would be 12·46 years' purchase, or £124·6 to return 5 per cent. interest and the purchase-money.

Years	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.	9 per cent.	10 per cent.	Years
1	0·97	0·96	0·95	0·94	0·94	0·93	0·92	0·91	1
2	1·91	1·89	1·86	1·83	1·81	1·78	1·76	1·74	2
3	2·83	2·78	2·72	2·67	2·62	2·58	2·53	2·49	3
4	3·72	3·63	3·55	3·47	3·39	3·31	3·24	3·17	4
5	4·58	4·45	4·33	4·21	4·10	3·99	3·89	3·79	5
6	5·42	5·24	5·08	4·92	4·77	4·62	4·49	4·36	6
7	6·23	6·00	5·79	5·58	5·39	5·21	5·03	4·87	7
8	7·02	6·73	6·46	6·21	5·97	5·75	5·54	5·34	8
9	7·79	7·44	7·11	6·80	6·52	6·25	6·00	5·76	9
10	8·53	8·11	7·72	7·36	7·02	6·71	6·42	6·15	10
11	9·25	8·76	8·31	7·89	7·50	7·14	6·81	6·50	11
12	9·95	9·39	8·86	8·38	7·94	7·54	7·16	6·81	12
13	10·64	9·99	9·39	8·85	8·36	7·90	7·49	7·10	13
14	11·30	10·56	9·90	9·30	8·75	8·24	7·79	7·37	14
15	11·94	11·12	10·38	9·71	9·11	8·56	8·06	7·61	15
16	12·56	11·65	10·84	10·11	9·45	8·85	8·31	7·82	16
17	13·17	12·17	11·27	10·48	9·76	9·12	8·54	8·02	17
18	13·75	12·66	11·69	10·83	10·06	9·37	8·76	8·20	18
19	14·32	13·13	12·09	11·16	10·34	9·60	8·95	8·37	19
20	14·88	13·59	12·46	11·47	10·59	9·82	9·13	8·51	20
21	15·42	14·03	12·82	11·76	10·84	10·02	9·29	8·65	21
22	15·94	14·45	13·16	12·04	11·06	10·20	9·44	8·77	22
23	16·44	14·86	13·49	12·30	11·27	10·37	9·58	8·88	23
24	16·94	15·25	13·80	12·55	11·47	10·53	9·71	8·99	24
25	17·41	15·62	14·09	12·78	11·65	10·68	9·82	9·08	25
26	17·88	15·98	14·38	13·00	11·83	10·81	9·93	9·16	26
27	18·33	16·33	14·64	13·21	11·99	10·94	10·03	9·24	27
28	18·76	16·66	14·90	13·41	12·14	11·05	10·12	9·31	28
29	19·19	16·98	15·14	13·59	12·28	11·16	10·20	9·37	29
30	19·60	17·29	15·37	13·77	12·41	11·26	10·27	9·43	30
31	20·00	17·59	15·59	13·93	12·53	11·35	10·34	9·48	31
32	20·39	17·87	15·80	14·08	12·65	11·44	10·41	9·53	32
33	20·77	18·15	16·00	14·23	12·75	11·51	10·46	9·57	33
34	21·13	18·41	16·19	14·37	12·85	11·59	10·52	9·61	34
35	21·49	18·67	16·37	14·50	12·95	11·66	10·57	9·64	35

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[1] Crosby Lockwood & Son.

TABLE IV—(*continued*).

Years	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.	9 per cent.	10 per cent.	Years
36	21·83	18·91	16·55	14·62	13·04	11·72	10·61	9·68	36
37	22·17	19·14	16·71	14·74	13·12	11·78	10·65	9·71	37
38	22·49	19·37	16·87	14·85	13·19	11·83	10·69	9·73	38
39	22·81	19·58	17·02	14·95	13·26	11·88	10·73	9·76	39
40	23·12	19·79	17·16	15·05	13·33	11·93	10·76	9·78	40
41	23·41	19·99	17·29	15·14	13·39	11·97	10·79	9·80	41
42	23·70	20·19	17·42	15·23	13·45	12·01	10·81	9·82	42
43	23·98	20·37	17·55	15·31	13·51	12·04	10·84	9·83	43
44	24·25	20·55	17·66	15·38	13·56	12·08	10·86	9·85	44
45	24·52	20·72	17·77	15·46	13·61	12·11	10·88	9·86	45
46	24·78	20·89	17·88	15·52	13·65	12·14	10·90	9·88	46
47	25·03	21·04	17·98	15·59	13·69	12·16	10·92	9·89	47
48	25·27	21·20	18·08	15·65	13·73	12·19	10·93	9·90	48
49	25·50	21·34	18·17	15·71	13·77	12·21	10·95	9·91	49
50	25·73	21·48	18·26	15·76	13·80	12·23	10·96	9·92	50
55	26·77	22·11	18·63	15·99	13·94	12·32	11·01	9·95	55
60	27·68	22·62	18·93	16·16	14·04	12·38	11·05	9·97	60
65	28·45	23·05	19·16	16·29	14·11	12·42	11·07	9·98	65
70	29·12	23·40	19·34	16·39	14·16	12·44	11·08	9·99	70
75	29·70	23·68	19·49	16·46	14·20	12·46	11·09	9·99	75
80	30·20	23·92	19·60	16·51	14·22	12·47	11·10	10·00	80
85	30·63	24·11	19·68	16·55	14·24	12·48	11·10	10·00	85
90	31·00	24·27	19·75	16·58	14·25	12·49	11·11	10·00	90
95	31·32	24·40	19·81	16·60	14·26	12·49	11·11	10·00	95
100	31·60	24·51	19·85	16·62	14·27	12·49	11·11	10·00	100
Perp.	33·33	25·00	20·00	16·67	14·29	12·50	11·11	10·00	Perp.

TABLE V.—EXPECTATION OF LIFE.

The following tables are taken from the Supplement to the 65th Annual Report of the Registrar-General of Births, Deaths and Marriages in England and Wales, 1891-1900, published in July, 1907.

AGE	MEAN AFTER-LIFETIME (EXPECTATION OF LIFE)		AGE	MEAN AFTER-LIFETIME (EXPECTATION OF LIFE)	
Years	Male	Female	Years	Male	Female
0	44·13	47·77	50	18·90	20·64
1	52·22	54·53	51	18·26	19·95
2	54·12	56·34	52	17·63	19·26
3	54·26	56·49	53	17·01	18·58
4	53·98	56·25	54	16·40	17·91
5	53·50	55·79	55	15·79	17·24
6	52·88	55·18	56	15·19	16·59
7	52·16	54·47	57	14·61	15·95
8	51·36	53·68	58	14·04	15·32
9	50·51	52·84	59	13·48	14·71

TABLE V—(*continued*).

AGE	MEAN AFTER-LIFETIME (EXPECTATION OF LIFE)		AGE	MEAN AFTER-LIFETIME (EXPECTATION OF LIFE)	
Years	Male	Female	Years	Male	Female
10	49·63	51·97	60	12·93	14·10
11	48·73	51·09	61	12·39	13·51
12	47·84	50·21	62	11·87	12·94
13	46·96	49·34	63	11·35	12·37
14	46·08	48·48	64	10·84	11·81
15	45·21	47·61	65	10·34	11·27
16	44·34	46·75	66	9·86	10·74
17	43·50	45·92	67	9·38	10·22
18	42·67	45·09	68	8·93	9·72
19	41·84	44·27	69	8·48	9·24
20	41·02	43·44	70	8·05	8·78
21	40·21	42·62	71	7·64	8·33
22	39·40	41·80	72	7·24	7·90
23	38·60	40·99	73	6·86	7·48
24	37·80	40·17	74	6·50	7·08
25	37·01	39·37	75	6·15	6·70
26	36·22	38·56	76	5·81	6·34
27	35·43	37·76	77	5·49	5·99
28	34·64	36·97	78	5·19	5·67
29	33·85	36·17	79	4·90	5·35
30	33·07	35·39	80	4·62	5·05
31	32·29	34·60	81	4·36	4·77
32	31·51	33·83	82	4·11	4·51
33	30·75	33·05	83	3·88	4·26
34	29·99	32·29	84	3·66	4·02
35	29·24	31·52	85	3·45	3·80
36	28·50	30·77	86	3·25	3·59
37	27·77	30·02	87	3·07	3·39
38	27·05	29·28	88	2·89	3·21
39	26·34	28·54	89	2·73	3·04
40	25·64	27·82	90	2·58	2·87
41	24·94	27·09	91	2·43	2·73
42	24·25	26·37	92	2·30	2·59
43	23·56	25·64	93	2·17	2·46
44	22·88	24·92	94	2·06	2·34
45	22·20	24·20	95	1·95	2·23
46	21·52	23·48	96	1·85	2·13
47	20·86	22·76	97	1·75	2·04
48	20·20	22·05	98	1·67	1·96
49	19·54	21·35	99	1·58	1·88
			100	1·51	1·81

SOLICITORS' COSTS FOR CONVEYANCES, &c.

The following authorised scale of costs has been fixed by General Order made in pursuance of the Solicitors' Remuneration Act, 1881.

Sales, Purchases, and Mortgages.

Vendor's Solicitor.—For negotiating a sale of property by private contract.—1 per cent. up to £3000 ; ½ per cent. after up to £10,000 ; afterward, ¼ per cent.

For deducing title to freehold, copyhold, or leasehold property, and perusing and completing conveyance (including preparation of contract or conditions of sale).—1½ per cent. on the first £1000 ; 1 per cent. on second and third £1000 ; ½ per cent. after up to £10,000 ; ¼ per cent. after.

For procuring execution and acknowledgment of deed by married woman, £2 10*s.* extra.

Purchaser's Solicitor.—For negotiating a purchase of property by private contract.—1 per cent. up to £3000 ; ½ per cent. up to £10,000 ; ¼ per cent. after.

For investigating title to freehold, copyhold, or leasehold property, and preparing and completing conveyance (including perusal and completion of contract, if any).—1½ per cent. on first £1000 ; 1 per cent. on second and third £1000 ; ½ per cent. after up to £10,000 ; ¼ per cent. after.

Mortgagor's Solicitor.—For deducing title to freehold, copyhold, or leasehold property, perusing mortgage, and completing.—1½ per cent. on first £1000 ; 1 per cent. on second and third £1000 ; ½ per cent. after up to £10,000 ; ¼ per cent. after.

For procuring execution and acknowledgment of deed by married woman, £2 10*s.* extra.

Mortgagee's Solicitor.—For negotiating loan.—1 per cent. up to £3000 ; ¼ per cent. after up to £10,000 ; 2*s.* 6*d.* per cent. after.

For investigating title to freehold, copyhold, or leasehold property, and preparing and completing mortgage.—1½ per cent. on first £1000 ; 1 per cent. on second and third £1000 ; ½ per cent. after up to £10,000 ; ¼ per cent. after.

Leases or Conveyances Reserving Rent.

Lessor's (*or Vendor's*) *Solicitor*.—For preparing, settling, and completing lease (not being a mining lease) and counterpart:

Scale I.—For ordinary leases at rack rent.—7½ per cent. on rent up to £100, £2 10*s*. on every [complete] £100 of rent over £100 up to £500, and then £1 on every [complete] £100 of any remaining rent. Minimum charge, £55.

Scale II.—For conveyances of freehold estates reserving rent, or for building leases reserving rent.—Where rent does not exceed £5, a charge of £5; where it exceeds £5 and does not exceed £50, the same payment as on a rent of £5 and also 20 per cent. on the excess beyond £5; where it exceeds £50 but does not exceed £150, the same payment as on a rent of £50 and 10 per cent. on the excess beyond £50; where it exceeds £150, the same payment as on a rent of £150 and 5 per cent. on the excess beyond £150.

Where a varying rent is payable, the 'annual rent' means the largest annual rent.

Lessee's (*or Purchaser's*) *Solicitor*.—For perusing draft and completing, one-half of the amount payable to the lessor's (or vendor's) Solicitor.

Where a conveyance or lease is partly in consideration of a money payment or premium, and partly of a rent, then, in addition to the remuneration hereby prescribed in respect of the rent, there shall be paid a further sum equal to the remuneration on a purchase at a price equal to such money payment or premium.

STAMP DUTIES.

	s.	*d.*
Agreement or Memorandum of Agreement, made in England or Ireland under hand only, or in Scotland without any clause of registration, and not otherwise specifically charged with any duty, whether the same be only evidence of a contract, or obligatory upon the parties from its being a written instrument	0	6

[The following are exempt: (1) Agreement or memorandum the matter whereof is not the value of £5; (2) Agreement or memorandum for the hire of any labourer, artificer, manufacturer, or menial servant; (3) Agreement, letter, or memorandum made for or relating to the sale of any goods, wares, or merchandise.

The Stamp Act, 1891 (54 & 55 Vict. c. 39), provides (s. 22) that where the duty of sixpence is payable upon an agreement the duty may be denoted by an adhesive stamp, which is to be cancelled by the person by whom the agreement is first executed. The person who cancels a stamp is to do so (s. 8) by writing on or across the stamp his name or initials, or the name or initials of his firm, together with the true date of his so writing, or otherwise so effectively cancel the stamp as to render the same incapable of being used again.]

	s.	*d.*
Bill of Exchange, payable on demand, for any amount	0	1
Bill of exchange or promissory note:—		
Not above £5	0	1
,, 10	0	2
,, 25	0	3
,, 50	0	6
,, 75	0	9
,, 100	1	0
And for every £100, and for any fractional part of £100, of such amount	1	0
[1] *Conveyance*, where the purchase-money does not exceed £5	0	6
,, Exceeding £5 and not exceeding £10 ..	1	0
,, ,, £10 ,, ,, £15 ..	1	6
,, ,, £15 ,, ,, £20 ..	2	0
,, ,, £20 ,, ,, £25 ..	2	6
,, For every additional £25 up to £300 ..	2	6
,, If exceeding £300, then for every £50 ..	5	0
[1] *Lease* or *Tack* of any dwelling-house, or part thereof, for term not exceeding a year, at rent not exceeding £10 a year	0	1

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[1] These duties are doubled under the Finance Act, 1909–10.

Lease or tack of any lands, houses, &c., at a yearly rent—

Exceeding	Not exceeding	Not exceeding 35 years.			Between 35 years and 100 years.			Exceeding 100 years.		
£	£	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
	5	0	0	6	0	3	0	0	6	0
5	10	0	1	0	0	6	0	0	12	0
10	15	0	1	6	0	9	0	0	18	0
15	20	0	2	0	0	12	0	1	4	0
20	25	0	2	6	0	15	0	1	10	0
25	50	0	5	0	1	10	0	3	0	0
50	75	0	7	6	2	5	0	4	10	0
75	100	0	10	0	3	0	0	6	0	0
100	for £50 or fractional part of £50	0	5	0	1	10	0	3	0	0

SURVEYORS' CHARGES.

The amount of work which Surveyors have to carry out in connection with building development varies considerably on different estates, and their charges will therefore differ somewhat according to the length of time that has to be devoted to meet the special requirements of each particular case. Subject to reasonable modifications, however, the following scale may be regarded as representing the charges usually made by experienced Surveyors for such work :—

1. For making careful detailed inspection of an estate for the purpose of formulating a prospective scheme of development; interviewing Local Authorities and making the necessary arrangements with them as to the application of their bye-laws and regulations; preparing 25-in. Ordinance sheets showing the proposed principal roads and lines of sewers to be constructed, and the different sections into which such estate can best be divided for development; and reporting fully as to the future management of the property during its maturing period, with suggestions as to improvements to be effected in the meanwhile, the charge

will vary according to area and other special circumstances, and may be from 1 to 3 guineas, per acre.

2. For surveying a building estate, preparing a large scale plan (44 feet to the inch), taking the necessary levels for sections and cross-sections and setting out on the plan the position of the proposed principal roads and sewers in accordance with local bye-laws and regulations, the charge may vary from 30*s*. to 50*s*. per acre.

3. For setting out on an Estate Plan provided by the owner, the proposed roads and sewers after taking the necessary levels, and preparing tracings and sections showing roads and sewers, applying for the approval of the Local Authorities and supplying all necessary drawings for that purpose, the charge is 2 per cent. on the estimated cost of formation.

4. For preparing specification, plans, sections and detail drawings, obtaining tenders, supplying one copy of drawings and specification to the contractor, superintending execution of works, examining and passing accounts, the usual charge is 3 to 4 per cent. on the cost of the works executed, in addition to the 2 per cent. mentioned in Clause 3.

5. For abstracting and preparing bill of quantities, and supplying copy of same to be incorporated in the Specification, the charge is 2 to 2½ per cent. on the estimated cost of the works.

6. The salary of the Clerk of the Works should be paid by the land-owner, but if such Clerk be provided by the Surveyor, an additional charge of 1 to 1½ per cent. on the cost of the works should be made.

7. For letting the several blocks or plots the charge is usually at the rate of one year's ground rent.

8. For preparing plans for building agreement and setting out blocks or plots, the charge is from 1 to 3 guineas.

9. For examining and approving plans submitted by the Lessee (or Purchaser) the charge is 2 guineas, per set; for inspecting the buildings during their progress so far as may be necessary to ensure the conditions being fulfilled, preparing plans and certifying for lease, the charge is based on a percentage of ¼ to 1 per cent. of the value of the respective houses.

10. For valuations for advances to builders, from ½ to 1 per cent. on the amount of advances.

11. For valuations for mortgage of leasehold or freehold house property, from ½ to 1 per cent. on the amount of valuations, but if no advance be made, one-third only of this charge is made.

12. In all cases travelling and other out-of-pocket expenses are paid by the client in addition to the fees.

13. *For Valuing and Negotiating the Settlement of Claims* under the Lands Clauses Consolidation Act, or other Acts for the compulsory acquisition of property, the charge is usually in accordance with Ryde's scale, which is as follows :—

On Amount of Settlement, Whether by Verdict, Award, or Otherwise.

Amt.	Gs.	Amt.	Gs.	Amt.	Gs.	Amt.	Gs.
£		£		£		£	
100	5	2,200	24	5,200	39	8,200	54
200	7	2,400	25	5,400	40	8,400	55
300	9	2,600	26	5,600	41	8,600	56
400	11	2,800	27	5,800	42	8,800	57
500	13	**3,000**	28	**6,000**	43	**9,000**	58
600	14	3,200	29	6,200	44	9,200	59
700	15	3,400	30	6,400	45	9,400	60
800	16	3,600	31	6,600	46	9,600	61
900	17	3,800	32	6,800	47	9,800	62
1,000	18	**4,000**	33	**7,000**	48	**10,000**	63
1,200	19	4,200	34	7,200	49	11,000	68
1,400	20	4,400	35	7,400	50	12,000	73
1,600	21	4,600	36	7,600	51	14,000	83
1,800	22	4,800	37	7,800	52	16,000	98
2,000	23	**5,000**	38	**8,000**	53	18,000	103
						20,000	113

Beyond this Half-a-Guinea per cent.

The above scale is exclusive of attendances on juries or umpires, or at arbitrations, and also of expenses and preparation of plans, preliminary reports, valuations, &c.

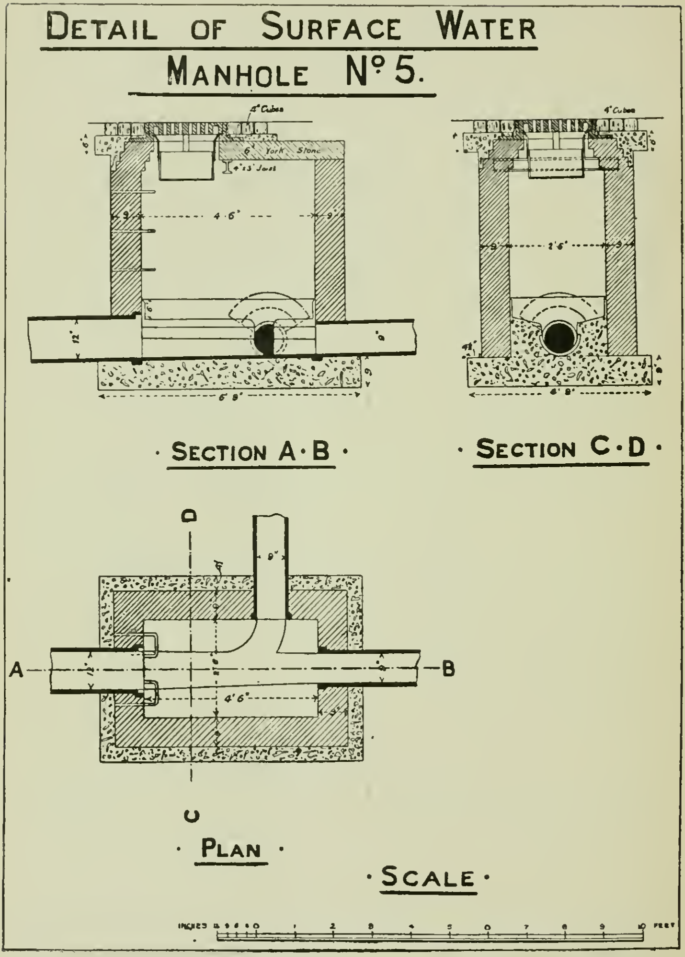

DETAIL OF SURFACE WATER
MANHOLE Nº 5.
4" Cubes
6" York Stone
4"×3" Joist
9"
4'6"
12"
9"
6'9"
· SECTION A·B ·
4" Cubes
9"
2'6"
6'9"
· SECTION C·D ·
D
9"
A
B
4'6"
C
· PLAN ·
· SCALE ·
INCHES 12 9 6 3 0 1 2 3 4 5 6 7 8 9 10 FEET

Fig. 21.

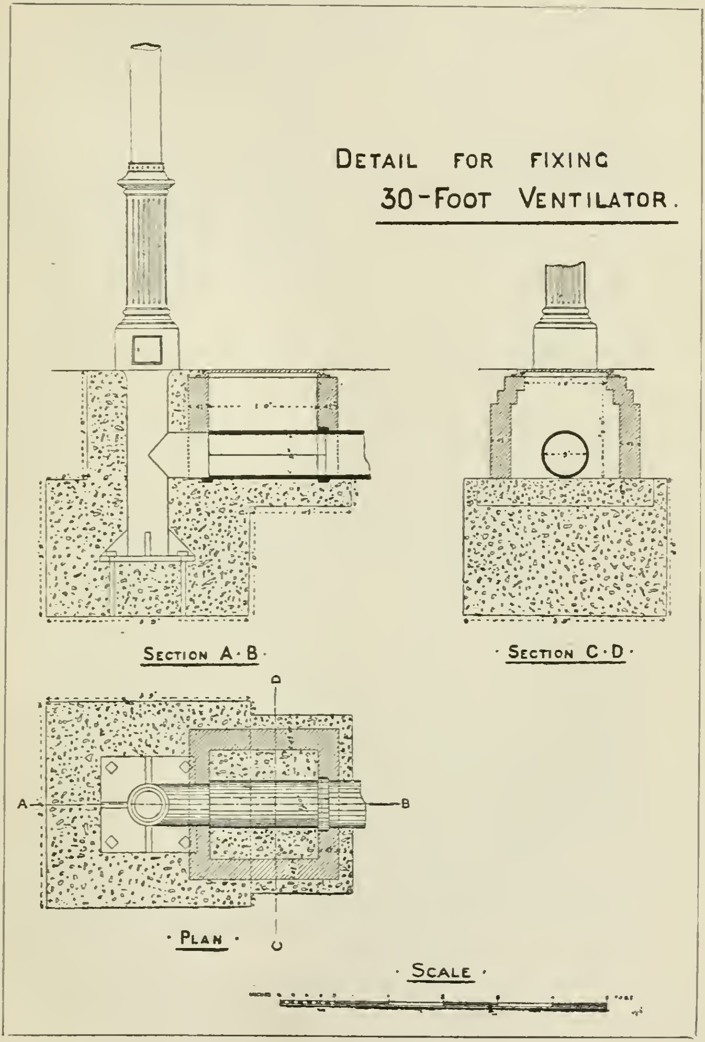
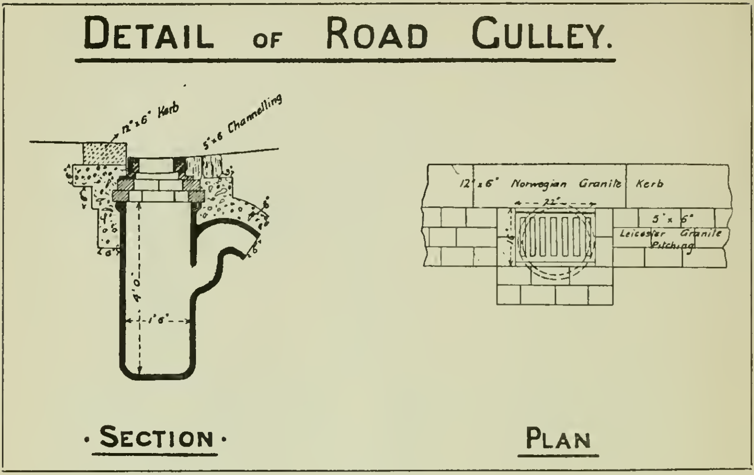

DETAIL FOR FIXING
30-FOOT VENTILATOR.
SECTION A·B·
·SECTION C·D·
·PLAN·
·SCALE·
A
B
C
D

Fig. 22.

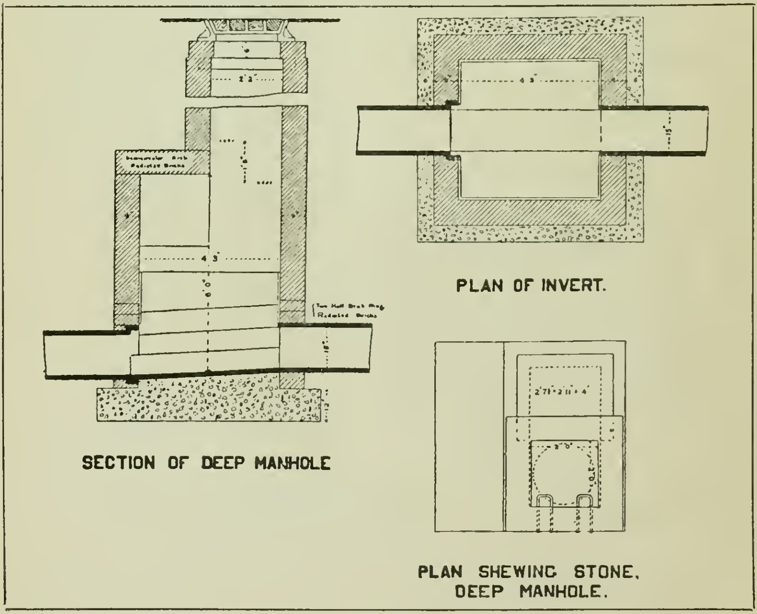

12"x6" Kerb
5"x6 Channelling
6"
6"
6"
4'0"
1'6"
12"x6" Norwegian Granite Kerb
22"
16"
5"x6" Leicester Granite Pitching

DETAIL OF ROAD CULLEY.

·SECTION·

PLAN

FIG. 23.

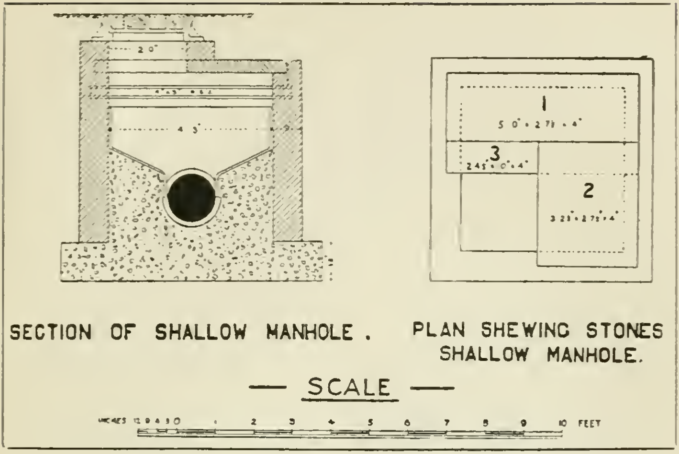


SECTION OF DEEP MANHOLE

PLAN OF INVERT.

PLAN SHEWING STONE, DEEP MANHOLE.

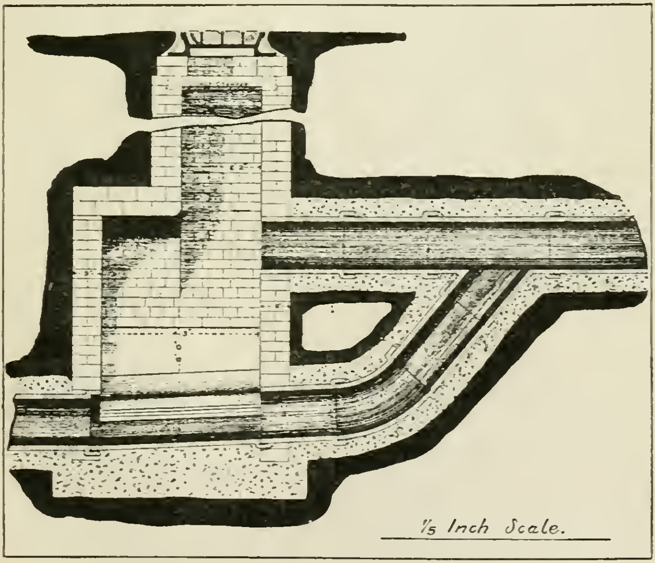
FIG. 24.



SECTION OF SHALLOW MANHOLE.

PLAN SHEWING STONES SHALLOW MANHOLE.

Fig. 25.



SECTION OF DECLINING-CURVE JUNCTION.

Fig. 26.

[illegible]

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